IRZ-25 Specific Capacity Testing Plan (September 17, 2019)

The objective of the specific capacity testing is to estimate the specific capacity for each individual remediation well screen. A packer system will be used to isolate the individual well screens for testing. Each screen will be tested at a minimum of three flow rates based on the 100% design target injection/extraction rate and field observations. The testing flow rate steps will be 50%, 100%, and 150% of the target rates respectfully. In some instances, an additional 200% rate step (or a higher rate) may be added. In general, each pumping step will last up to 2 hours however, adjustments to pumping step durations may be made in the field based on drawdown stabilization during the initial specific capacity evaluation or as directed by the engineer. These tests will typically be conducted over a 6- to 12-hour period depending on the performance of the well. During the test, water level in the pumping well and nearby monitoring wells identified prior to the test will be monitored using pressure transducers.

An initial specific capacity **evaluation** will be conducted on each screen zone before the specific capacity **test** is performed to evaluate stabilized pumping rates in conjunction with stabilized water levels to develop preliminary specific capacity information (gpm per foot drawdown). This data collected during the initial specific capacity evaluation will be used to produce maximum pumping rates for the specific capacity test.

Water (IDW) that is generated during testing will be stored in frack tanks provided by the well construction manager. Some of this IDW may be used for future injectivity testing. Any IDW not used for injectivity testing shall be disposed of by the well construction manager. Timing of specific capacity testing to injectivity testing could be adjusted to accommodate IDW. For instance, the Injectivity test for one particular screen zone can be conducted the day after the specific capacity test is completed to avoid managing water generated from two capacity tests.

Pressure Transducers: Prior to conducting the specific capacity test, the pressure transducers from nearby surrounding well locations will be downloaded and reset to record at 5-minute intervals. **Pressure transducers in the following wells will be downloaded and reset: MW-20-70, MW-20-100, MW-20-130, and MW-E-70. Note the manual DTW and time the pressure transducer was downloaded at each location.** Pressure transducers will need to be installed and programmed within the surrounding newly installed IRZ/MW well locations at **IRZ-23** and **MW-E-142**. In addition, the DTW and time when the pressure transducer was downloaded/programmed at each location will be measured manually and recorded**.** Manual depth to water measurements will be collected within these surrounding wells just prior to test start and periodically during the test (a good rule of thumb would be to collect a reading before the test starts, a reading in the middle of each step, and a reading toward the end of each step). A manual depth to water measurement will also need to be collected after the test is completed.

A pressure transducer will be installed in the testing well screen and water level/head measurement will be recorded using a programmed time scale frequency (see chart below) from test start until test completion (more frequent measurements will be collected early for each time step than later in the test). A pressure transducer will also be installed in the testing well within any of the non-specific capacity testing screen intervals if any and water level/head measurements will be recorded at a programmed reading frequency of 30 second intervals from test start until test completion.

Pumping Specifics: The 100% design target injection/extraction rate for each screen at IRZ-25 is 18 gpm and the maximum (200% target if conducted) flow rate will be 36 gpm. Target flow rates may be adjusted based on the initial specific capacity evaluation. Test duration is flexible. The most important objective is stabilization of drawdown at a constant flow rate for a period greater than or equal to 120 minutes. If the water level is unable to stabilize at the highest estimated flow rate, the pumping duration may be extended on the highest sustainable flow rate. The engineer will determine the maximum pumping duration if the highest estimated flow rate cannot be achieved. Maximum sustainable flow rate will be the highest sustained flow rate with 5 or more feet of water above the submersible pump. Once the pump has been stopped and the evaluation/testing is complete, monitor recharge (DTW) every minute until water level is within 10% of static water level or as directed by engineer.

When starting the initial specific capacity evaluation and test and during each consecutive increase in flow rate (step), time, pumping rate (gpm), totalizer reading (gal), manual DTW measurements (feet btoc) in both pumping screen and all other screens on the specific capacity log. **Recording frequency for the initial specific capacity evaluation will be every minute**. Recording frequency is as follow for the **Specific Capacity Test**:

Time (start of each step):	**Record Frequency:**
First minute	As many measurements as possible in first minute (goal at least 3 to 5 measurements)
1-10 minutes	Every **1** minute
10 – 30 minutes	Every **2** minutes
30 – 60 minutes	Every **5** minutes
>60 Minutes	Every **10** minutes

The transducer in the pumping well will be collecting data using the "event" feature. All transducers within the pumping well (pumping screen/non-pumping screens) will be collecting water level measurements at 30 second intervals during the **initial specific capacity evaluation**. The transducer within and non-injection screens will be collecting water level measurements at 30 second intervals during the **specific capacity test** (this transducer can remain running during both the initial evaluation and the test). Before the beginning of EACH STEP, the transducer within the pumping screen will be programed to collect water level measures during the **specific capacity test** on the following frequency:

Time (start of each step):	**Record Frequency:**
1 minute before the test start	Every second
First 10 minutes	Every second
10-30 minutes	Every 10 seconds
30 – 240 minutes (Maximum duration of each Step)	Every 1 minute
Total of 241 minutes of scheduled reading time	

Sampling: Near the end of the specific capacity test a discrete water quality sample will be collected from the isolated screen interval (i.e., an inflatable packer will be used to isolate the screen). Samples will be collected from each tested screen zone. A parameter, bottle, and filtration requirements are listed in the attached sample matrix table. Dissolved metals analyses require **field filtration**.

Field parameters (Temp, pH, SP Conductivity, DO, ORP, Turbidity) will need to be collected at least once per step (collect just before completion of a step).

Totalizer will be **digital and tested** before use at each well location. Testing of the totalizer will be done at Transwestern Bench or at the testing well location by pumping water through the totalizer and manually checking flow rate against totalizer value produced. The totalizer testing will be documented in the field notes.

Initial specific capacity evaluation and specific capacity testing procedures are as follow:

Initial Specific Capacity Evaluation (Lower Screen Interval {135'-166' bgs}):

1. Starting with the Lower screen interval (135'-166' bgs), install packer with pass through for transducer and submersible pump. Set Packer in well blank (non-screened portion of well) between the lower and middle screen intervals. Be sure that submersible pump intake is sitting just above the bottom of the lower screen zone leaving room for water level drawdown. Record submersible pump depth and packer depth. Set one pressure transducer in the lower screen zone through the packer pass through and one pressure transducer in the upper/middle screen zones above the packer. **Record Packer length to accurately measure packer placement.**

2. Record the number of pipe segments installed to confirm packer and submersible pump is set to correct depth.

3. Cascade will inflate packer (record pressure) using nitrogen gas to isolate lower screen zone from upper/middle screen zones. Once inflated, record manual depth to water above packer and in pass through where pressure transducer was installed.

4. Program pressure transducers within the testing well with ID and set to record as an 'Event' using the sample frequency as defined above.

5. Ensure that all pressure transducers in surrounding wells are programmed to read at 5-minute intervals. **These can be reprogramed while packer is being set up or any time before the evaluation begins.** Document date/time and manual water level when programing surrounding well transducers. Monitor DTW in surrounding wells periodically during testing.

6. Hookup fire hose from pumping outlet to discharge pumped water to the frac tank. This could be up to ~800 feet from the well to the intake up the storage tank(s). If 2 tanks may be required to hold water capacity, a split will need to be used to transport water without having to move the hose or stopping the pump. Ensure that fire hose has secondary containment underneath all hose connections.

7. Provide sample port at wellhead for Engineer to obtain samples and water for measuring water quality parameters.

8. Begin Evaluation. **Note: If water level above packer begins to drop at any point of this evaluation, packer may not be sealing properly. The evaluation must be stopped, and packer needs to be reset.**
    - Approximate Rates and Durations (**flexible**):
        - Pumping @ 9 gpm respectfully (50% design rate) for 15 minutes
        - Pumping @ 18 gpm respectfully (100% design rate) for 15 minutes
        - Pumping @ 27 gpm respectfully (150% design rate) for 15 minutes
        - Pumping @ 36 gpm respectfully (200% design rate) for 15 minutes
        - Pumping @ maximum sustainable flow rate (open pump if possible) for 15 minutes

9. Evaluation complete after maximum sustainable flow rate is reached with a minimal drawdown of approximately 5 feet above the submersible pump or otherwise directed by engineer. Stop submersible pump and monitor water levels (recharge) manually and with pressure transducers every minute until water level is within 10% of static water level or otherwise directed by the engineer.

Specific Capacity Test (Lower Screen Interval {135'-166' bgs}):

1. Leaving all materials downhole, ensure that water level is within 10% of static water level or better.

2. Program the transducer in the pumping well using the "event" feature for the first step. See frequency above.

3. Begin Specific Capacity Test:
    - 9 gpm respectfully (or as adjusted based on the initial specific capacity evaluation) for 2-4 hours.
        - Record pumping rate (gpm), manual DTW measurements in all screens (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.
        - Collected parameters (Temp, pH, Sp conductivity, DO, ORP, Turbidity) at end of step.

    - 18 gpm respectfully (or as adjusted based on the initial specific capacity evaluation) for 2-4 hours.
        - Record pumping rate (gpm), manual DTW measurements in all screens (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.
        - Collected parameters (Temp, pH, Sp conductivity, DO, ORP, Turbidity) at end of step.

    - 27 gpm respectfully (or as adjusted based on the initial specific capacity evaluation) for 2-4 hours.
        - Record pumping rate (gpm), manual DTW measurements in all screens (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.
        - Collected parameters (Temp, pH, Sp conductivity, DO, ORP, Turbidity) at end of step.

    - 36 gpm respectfully (or as adjusted based on the initial specific capacity evaluation) for 2-4 hours.
        - Record pumping rate (gpm), manual DTW measurements in all screens (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.
        - Collected parameters (Temp, pH, Sp conductivity, DO, ORP, Turbidity) at end of step.

    - Maximum pump compacity if possible, for 2-4 hours.
        - Record pumping rate (gpm), manual DTW measurements in all screens (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.
        - Collected parameters (Temp, pH, Sp conductivity, DO, ORP, Turbidity) at end of step.

Note: Pumping durations may be longer than 2 hours at each pumping rate as directed by the engineer.

4. Check with QC Geologist to ensure test has been fully completed prior to stopping submersible pump. Once QC geologist has approved completion, collect sample from sampling port.

5. Stop submersible pump and monitor water levels (recharge) manually and with pressure transducers every minute until water level is within 10% of static water level (based on the final amount of observed drawdown) or otherwise directed by the engineer.

6. Download pressure transducers within all testing well screen zones

7. Deflate packer and remove both packer and pump for testing of the middle screen interval.

Initial Specific Capacity Evaluation (Middle Screen Interval {77'-100' bgs}):

1. Install combined lower packer, submersible pump and upper packer system with packer pass throughs for transducers/water level meters. Ensure packers are within well blanks (non-screened portion of well) between the lower and middle screen intervals and the middle and upper screen intervals. **Attached by cable, one transducer to the bottom of the lower packer to record water level within lower screen interval.** Record top of Packer to accurately measure packer placement.

2. Record the number of pipe segments installed to confirm packers and submersible pump are set to correct depths.

3. Set one pressure transducer in the middle screen zone through the upper packer pass through and one pressure transducer in the upper screen zone above the upper packer.

4. Cascade will inflate lower packer and upper packer using nitrogen gas to isolate the lower screen zone and the upper screen zone from the middle screen zone. Once inflated, record pressure from both packers and manual depth to water above upper packer within the upper screen zone and in pass through where pressure transducer was installed in the middle screen zone.

5. Program the transducers in the pumping well using the "event" feature. See frequency above.

6. All pressure transducers in surrounding wells should already be programmed to read at 5-minute intervals. Monitor DTW in surrounding wells periodically during testing.

7. Hookup fire hose from pumping outlet to discharge pumped water to the frac tank. This could be up to ~800 feet from the well to the intake up the storage tank(s). If 2 tanks may be required to hold water capacity, a split will need to be used to transport water without having to move the hose or stopping the pump. Ensure that fire hose has secondary containment underneath all hose connections.

8. Provide sample port at wellhead for Engineer to obtain samples and water for measuring water quality parameters.

10. Begin Evaluation. **Note: If water level above packer begins to drop at any point of this evaluation, packer may not be sealing properly. The evaluation must be stopped, and packer needs to be reset.**
    - Approximate Rates and Durations (**flexible**):
        - Pumping @ 9 gpm respectfully (50% design rate) for 15 minutes
        - Pumping @ 18 gpm respectfully (100% design rate) for 15 minutes
        - Pumping @ 27 gpm respectfully (150% design rate) for 15 minutes
        - Pumping @ 36 gpm respectfully (200% design rate) for 15 minutes
        - Pumping @ maximum sustainable flow rate (open pump if possible) for 15 minutes

11. Evaluation complete after maximum sustainable flow rate is reached with a minimal drawdown of approximately 5 feet above the submersible pump or otherwise directed by engineer. Stop submersible pump and monitor water levels (recharge) manually and with pressure transducers every minute until water level is within 10% of static water level or otherwise directed by the engineer.

Specific Capacity Test (Middle Screen Interval {77'-100' bgs}):

1. Leaving all materials downhole, ensure that water level is within 10% of static water level or better.

2. Program the transducer in the pumping well using the "event" feature for the first step. See frequency above.

3. Begin Specific Capacity Test:
    - 9 gpm respectfully (or as adjusted based on the initial specific capacity evaluation) for 2-4 hours.
        - Record pumping rate (gpm), manual DTW measurements in all screens (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.
        - Collected parameters (Temp, pH, Sp conductivity, DO, ORP, Turbidity) at end of step.

    - 18 gpm respectfully (or as adjusted based on the initial specific capacity evaluation) for 2-4 hours.
        - Record pumping rate (gpm), manual DTW measurements in all screens (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.
        - Collected parameters (Temp, pH, Sp conductivity, DO, ORP, Turbidity) at end of step.

    - 27 gpm respectfully (or as adjusted based on the initial specific capacity evaluation) for 2-4 hours.
        - Record pumping rate (gpm), manual DTW measurements in all screens (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.
        - Collected parameters (Temp, pH, Sp conductivity, DO, ORP, Turbidity) at end of step.

    - 36 gpm respectfully (or as adjusted based on the initial specific capacity evaluation) for 2-4 hours.
        - Record pumping rate (gpm), manual DTW measurements in all screens (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.
        - Collected parameters (Temp, pH, Sp conductivity, DO, ORP, Turbidity) at end of step.

    - Maximum pump compacity if possible, for 2-4 hours.
        - Record pumping rate (gpm), manual DTW measurements in all screens (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.
        - Collected parameters (Temp, pH, Sp conductivity, DO, ORP, Turbidity) at end of step.

Note: Pumping durations may be longer than 2 hours at each pumping rate as directed by the engineer.

4. Check with QC Geologist to ensure test has been fully completed prior to stopping submersible pump. Once QC geologist has approved completion, collect sample from sampling port.

5. Stop submersible pump and monitor water levels (recharge) manually and with pressure transducers every minute until water level is within 10% of static water level (based on the final amount of observed drawdown) or otherwise directed by the engineer.

6. Download and pull up pressure transducers before deflating and pulling packers and submersible pump from the well.

7. Deflate packer and pull packers and submersible pump from well.

Initial Specific Capacity Evaluation (Upper Screen Interval {50'-67' bgs}):

1. Install packer with pass through for transducer and submersible pump. Set Packer in well blank (non-screened portion of well) between the middle and upper screen intervals. Be sure that submersible pump intake is sitting just above the bottom of the upper screen zone leaving room for water level drawdown. Record submersible pump depth and packer depth. Set one pressure transducer in the middle/lower screen zones through the packer pass through and one pressure transducer in the upper screen zone above the packer. **Record Packer length to accurately measure packer placement.**

2. Record the number of pipe segments installed to confirm packer and submersible pump is set to correct depth.

3. Cascade will inflate packer using nitrogen gas to isolate lower/middle screen zones from upper screen zone. Once inflated, record packer pressure and manual depth to water above packer and in pass through where pressure transducer was installed.

4. Program pressure transducers within the testing well with ID and set to record as an 'Event' using the sample frequency as defined above.

5. All pressure transducers in surrounding wells should already be programmed to read at 5-minute intervals. Monitor DTW in surrounding wells periodically during testing.

6. Hookup fire hose from pumping outlet to discharge pumped water to the frac tank. This could be up to ~800 feet from the well to the intake up the storage tank(s). If 2 tanks may be required to hold water capacity, a split will need to be used to transport water without having to move the hose or stopping the pump. Ensure that fire hose has secondary containment underneath all hose connections.

7. Provide sample port at wellhead for Engineer to obtain samples and water for measuring water quality parameters.

8. Begin Evaluation. **Note: If water level above packer begins to drop at any point of this evaluation, packer may not be sealing properly. The evaluation must be stopped, and packer needs to be reset.**
    a. Approximate Rates and Durations (**flexible**):
        i. Pumping @ 9 gpm respectfully (50% design rate) for 15 minutes
        ii. Pumping @ 18 gpm respectfully (100% design rate) for 15 minutes
        iii. Pumping @ 27 gpm respectfully (150% design rate) for 15 minutes
        iv. Pumping @ 36 gpm respectfully (200% design rate) for 15 minutes
        v. Pumping @ maximum sustainable flow rate (open pump if possible) for 15 minutes

9. Evaluation complete after maximum sustainable flow rate is reached with a minimal drawdown of approximately 5 feet above the submersible pump or otherwise directed by engineer. Stop submersible pump and monitor water levels (recharge) manually and with pressure transducers every minute until water level is within 10% of static water level or otherwise directed by the engineer.

Specific Capacity Test (Upper Screen Interval {50'-67' bgs}):

1. Leaving all materials downhole, ensure that water level is within 10% of static water level or better.

2. Program the transducer in the pumping well using the "event" feature for the first step. See frequency above.

3. Begin Specific Capacity Test:
    - 9 gpm respectfully (or as adjusted based on the initial specific capacity evaluation) for 2-4 hours.
        - Record pumping rate (gpm), manual DTW measurements in all screens (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.
        - Collected parameters (Temp, pH, Sp conductivity, DO, ORP, Turbidity) at end of step.

    - 18 gpm respectfully (or as adjusted based on the initial specific capacity evaluation) for 2-4 hours.
        - Record pumping rate (gpm), manual DTW measurements in all screens (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.
        - Collected parameters (Temp, pH, Sp conductivity, DO, ORP, Turbidity) at end of step.

    - 27 gpm respectfully (or as adjusted based on the initial specific capacity evaluation) for 2-4 hours.
        - Record pumping rate (gpm), manual DTW measurements in all screens (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.
        - Collected parameters (Temp, pH, Sp conductivity, DO, ORP, Turbidity) at end of step.

    - 36 gpm respectfully (or as adjusted based on the initial specific capacity evaluation) for 2-4 hours.
        - Record pumping rate (gpm), manual DTW measurements in all screens (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.
        - Collected parameters (Temp, pH, Sp conductivity, DO, ORP, Turbidity) at end of step.

    - Maximum pump compacity if possible, for 2-4 hours.
        - Record pumping rate (gpm), manual DTW measurements in all screens (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.
        - Collected parameters (Temp, pH, Sp conductivity, DO, ORP, Turbidity) at end of step.

Note: Pumping durations may be longer than 2 hours at each pumping rate as directed by the engineer.

4. Check with QC Geologist to ensure test has been fully completed prior to stopping submersible pump. Once QC geologist has approved completion, collect sample from sampling port.

5. Stop submersible pump and monitor water levels (recharge) manually and every minute until water level is within 10% of static water level (based on the final amount of observed drawdown) or otherwise directed by the engineer.

6. Download pressure transducers within all testing well screen zones.

7. Deflate packer and remove both packer and pump.

8. Download all pressure transducer data from the surrounding well locations and reset pressure transducers to their normal schedules. This can be done the next day as its best to let the surrounding wells equilibrate.

9. Download baro pressure transducer located at IM3 station.

Test complete.

IRZ-25 Injectivity Testing Plan (September 21, 2019)

The objective of the Injectivity testing is to estimate the injectability for each individual remediation well screen. A packer system will be used to isolate the individual well screens for testing. Each screen will be tested at a minimum of three flow rates based on the 100% design target injection/extraction rate. The testing injection rate steps will be 50%, 100%, and 150% of the target rates respectfully. In some instances, an additional 200% rate step (or higher) may be added. In general, each injection step will last up to 2 hours however, adjustments to injection durations may be made in the field based on mounding stabilization during the initial injectivity evaluation or as directed by the engineer. These tests will typically be conducted over a 6- to 12-hour period depending on the performance of the well. During the test, water level in the testing well and nearby monitoring wells identified prior to the test will be monitored using pressure transducers.

An initial injectivity **evaluation** will be conducted on each screen zone before the injectivity **test** is performed to evaluate stabilized injection rates in conjunction with stabilized water levels to develop preliminary injectivity information (gpm injected per foot of mounding). This data collected during the initial injectivity evaluation will be used to produce maximum injection rates for the injectivity test.

Water (IDW) that was generated during the specific capacity testing for each screen interval zone within the testing well and stored in individual frack tanks may be used pending laboratory data and approval from the well construction manager. Fresh water can also be used when not using IDW water generated during specific capacity testing. **For IRZ-25, Fresh water will be used to conduct the injectivity test.** Timing of specific capacity testing to injectivity testing could be adjusted to accommodate IDW. For instance, the Injectivity test for one particular screen zone can be conducted the day after the specific capacity test is completed to avoid managing water generated from two capacity tests.

Pressure Transducers: Prior to conducting the Injectivity test, the pressure transducers from nearby surrounding well locations will be downloaded and reset to record at 5-minute intervals. **Pressure transducers in the following wells will be downloaded and reset: MW-20-70, MW-20-100, MW-20-130, and MW-E-70. Note the manual DTW and time the pressure transducer was downloaded at each location.** Pressure transducers will need to be installed (if not already) and programmed within the surrounding newly installed IRZ/MW well locations at **IRZ-23** and **MW-E-142**. In addition, the DTW and time when the pressure transducer was downloaded/programmed at each location will be measured manually and recorded**.** Manual depth to water measurements will be collected within these surrounding wells just prior to test start and periodically during the test (a good rule of thumb would be to collect a reading before the test starts, a reading in the middle of each step, and a reading toward the end of each step). A manual depth to water measurement will also need to be collected after the test is completed.

A pressure transducer will be installed in the testing well screen and water level/head measurement will be recorded using a programmed time scale frequency (see chart below) from test start until test completion (more frequent measurements will be collected early for each time step than later in the test). A pressure transducer will also be installed in the testing well within any of the non-specific capacity testing screen intervals if any and water level/head measurements will be recorded at a programmed reading frequency of 30 second intervals from test start until test completion.

Pumping Specifics: The 100% design target injection/extraction rate for each screen at IRZ-25 is 18 gpm and the maximum (200% target if conducted) injection rate will be 36 gpm. Target injection rates may be adjusted based on the initial Injectivity evaluation. Test duration is flexible. The most important objective is stabilization of the injection rates for greater than or equal to 120 minutes. **The goal is to monitor mounding and make sure water level does not exceed top of casing within the water level monitoring port.** If the water level is unable to stabilize at the highest estimated injection rate, the pumping duration will be extended on the highest sustainable flow rate. The engineer will determine the maximum pumping duration if the highest estimated injection rate cannot be achieved. Maximum sustainable injection rate will be the highest sustained injection rate where a depth to water of 10 ft or lower is

maintained within the water level monitoring port or top of well casing. Once injections have been stopped and the evaluation/testing is complete, monitor drawdown (DTW) every minute until water level is within 10% of static water level or directed by engineer.

When starting the injectivity evaluation and test and during each consecutive increase in injection rates (step), record injection rate (gpm), Injection pressure (psi), manual DTW measurements (feet btoc), and totalizer values on injectivity log. **Recording frequency for the initial injectivity evaluation will be every minute.** Recording frequency is as follow for the **injectivity test**:

Time (start of each step):	**Record Frequency:**
First minute	As many measurements as possible in first minute (goal at least 3 to 5 measurements)
1-10 minutes	Every **1** minute
10 – 30 minutes	Every **2** minutes
30 – 60 minutes	Every **5** minutes
>60 Minutes	Every **10** minutes

The transducer in the pumping well will be collecting data using the "event" feature. All transducers within the injection well (injecting screen/non-injecting screens) will be collecting water level measurements at 30 second intervals during the **initial injectivity evaluation**. The transducer within and non-injection screens will be collecting water level measurements at 30 second intervals during the **injectivity test**. Before the beginning of EACH STEP, the transducer within the injection screen will be programed to collect water level measures during the **injectivity test** on the following frequency:

Time (start of each step):	**Record Frequency:**
1 minute before the test start	Every second
First 10 minutes	Every second
10-30 minutes	Every 10 seconds
30 – 240 minutes (Maximum duration of each Step)	Every 1 minute
Total of 241 minutes of scheduled reading time	

Totalizer will be **digital and tested** before use at each well location. Testing of the totalizer will be done at Transwestern Bench or at the testing well location by pumping water through the totalizer and manually checking flow rate against totalizer value produced. The totalizer testing will be documented in the field notes.

Initial specific capacity evaluation and specific capacity testing procedures are as follow:

Initial Injectivity Evaluation (Lower Screen Interval {135'-166' bgs}):

1. Starting with the Lower screen interval (135'-166' bgs), install packer with pass through for transducer and trim pipe for injection. Set Packer in well blank (non-screened portion of well) between the lower and middle screen intervals. Set one pressure transducer in the lower screen zone through the packer pass through and one pressure transducer in the upper screen zone above the packer. **Record Packer length to accurately measure packer placement.**

2. Record the number of pipe segments installed to confirm packer is set to correct depth.

3. Cascade will inflate packer (record pressure) using nitrogen gas to isolate lower screen zone from upper/middle screen zones. Once inflated, record manual depth to water above packer and in pass through where pressure transducer was installed.

4. Program pressure transducers within the testing well with ID and set to record as an 'Event' using the sample frequency as defined above.

5. Ensure that all pressure transducers in surrounding wells are programmed to read at 5-minute intervals. **These can be reprogramed while packer is being set up or any time before the evaluation begins.** Document date/time and manual water level when programing surrounding well transducers. Monitor DTW in surrounding wells periodically during testing.

6. Hookup fire hose from frack tanks holding injection water to pump inlet. Ensure that fire hose has secondary containment underneath all hose connections.

7. Begin Evaluation. **Note: If water level above packer begins to rise at any point of this evaluation, packer is not sealing properly. The evaluation must be stopped, and packer needs to be reset.**
    - Approximate Rates and Durations (**flexible**):
        - Inject @ 9 gpm respectfully (50% design rate) for 15 minutes
        - Inject @ 18 gpm respectfully (100% design rate) for 15 minutes
        - Inject @ 27 gpm respectfully (150% design rate) for 15 minutes
        - Inject @ 36 gpm respectfully (200% design rate) for 15 minutes
        - Inject @ maximum sustainable flow rate for 15 minutes if possible

8. Evaluation complete after maximum sustainable injection rate is reached where a depth to water of 10 ft or lower is maintained within water level monitoring port or otherwise directed by engineer. Stop injecting and monitor water levels manually every minute until water level is within 10% of static water level or otherwise directed by the engineer.

Injectivity Test (Lower Screen Interval {135'-166' bgs}):

1. Leaving all materials downhole, ensure that water level is within 10% of static water level or better.

2. Program pressure transducers within the testing well with ID and set to record as an 'Event' using the sample frequency as defined above.

3. Begin Injectivity Test:
    - 9 gpm respectfully (or as adjusted based on the initial injectivity evaluation) for 2 hours.
        - Record injection rate (gpm), Injection pressure (psi), manual DTW measurements (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.

    - 18 gpm respectfully (or as adjusted based on the initial injectivity evaluation) for 2 hours.
        - Record injection rate (gpm), Injection pressure (psi), manual DTW measurements (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.

    - 27 gpm respectfully (or as adjusted based on the initial injectivity evaluation) for 2 hours.
        - Record injection rate (gpm), Injection pressure (psi), manual DTW measurements (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.

    - 36 gpm respectfully (or as adjusted based on the initial injectivity evaluation) for 2 hours **if possible.**
        - Record injection rate (gpm), Injection pressure (psi), manual DTW measurements (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.

Note: Pumping durations may be longer than 2 hours at each pumping rate as directed by the engineer.

4. Check with QC Geologist to ensure test has been fully completed prior to stopping injections.

5. Stop injection and monitor water levels manually every minute until water level is within 10% of static water level or otherwise directed by the engineer.

6. Download pressure transducers within all testing well screen zones.

7. Download pressure transducers from all surrounding wells being monitored.

8. Deflate packer and remove both packer and piping for testing of the middle screen interval.

Initial Injectivity Evaluation (Middle Screen Interval {77'-100' bgs}):

1. Install combined lower packer and upper packer system with packer pass throughs for transducers/water level meters. Ensure packers are within well blanks (non-screened portion of well) between the lower and middle screen intervals and the middle and upper screen intervals. **Attached by cable, one transducer to the bottom of the lower packer to record water level within lower screen interval.**

2. Record the number of pipe segments installed to confirm packers are set to correct depths.

3. Set one pressure transducer in the middle screen zone through the upper packer pass through and one pressure transducer in the upper screen zone above the upper packer.

4. Cascade will inflate lower packer and upper packer using nitrogen gas to isolate the lower screen zone and the upper screen zone from the middle screen zone. Once inflated, record pressure from both packers and manual depth to water above upper packer within the upper screen zone and in pass through where pressure transducer was installed in the middle screen zone.

5. Program the transducers in the pumping well using the "event" feature. See frequency above.

6. All pressure transducers in surrounding wells should already be programmed to read at 5-minute intervals. Monitor DTW in surrounding wells periodically during testing.

7. Hookup fire hose from frack tanks holding injection water to pump inlet. Ensure that fire hose has secondary containment underneath all hose connections.

8. Provide sample port at wellhead for Engineer to obtain samples and water for measuring water quality parameters.

9. Begin Evaluation. **Note: If water level above packer begins to rise at any point of this evaluation, packer is not sealing properly. The evaluation must be stopped, and packer needs to be reset.**
    - Approximate Rates and Durations (**flexible**):
        - Inject @ 9 gpm respectfully (50% design rate) for 15 minutes
        - Inject @ 18 gpm respectfully (100% design rate) for 15 minutes
        - Inject @ 27 gpm respectfully (150% design rate) for 15 minutes
        - Inject @ 36 gpm respectfully (200% design rate) for 15 minutes
        - Inject @ maximum sustainable flow rate for 15 minutes if possible

10. Evaluation complete after maximum sustainable injection rate is reached where a depth to water of 10 ft or lower is maintained within water level monitoring port or otherwise directed by engineer. Stop injection and monitor water levels manually and with pressure transducers every minute until water level is within 10% of static water level or otherwise directed by the engineer.

Injectivity Test (Middle Screen Interval {77'-100' bgs}):

1. Leaving all materials downhole, ensure that water level is within 10% of static water level or better.

2. Program pressure transducers within the testing well with ID and set to record as an 'Event' using the sample frequency as defined above.

3. Begin Injectivity Test:
    - 9 gpm respectfully (or as adjusted based on the initial injectivity evaluation) for 2 hours.
        - Record injection rate (gpm), Injection pressure (psi), manual DTW measurements (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.

    - 18 gpm respectfully (or as adjusted based on the initial injectivity evaluation) for 2 hours.
        - Record injection rate (gpm), Injection pressure (psi), manual DTW measurements (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.

    - 27 gpm respectfully (or as adjusted based on the initial injectivity evaluation) for 2 hours.
        - Record injection rate (gpm), Injection pressure (psi), manual DTW measurements (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.

    - 36 gpm respectfully (or as adjusted based on the initial injectivity evaluation) for 2 hours **if possible.**
        - Record injection rate (gpm), Injection pressure (psi), manual DTW measurements (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.

Note: Pumping durations may be longer than 2 hours at each pumping rate as directed by the engineer.

4. Check with QC Geologist to ensure test has been fully completed prior to stopping injections.

5. Stop injection and monitor water levels manually every minute until water level is within 10% of static water level or otherwise directed by the engineer.

6. Download pressure transducers within all testing well screen zones.

7. Download pressure transducers from all surrounding wells being monitored.

8. Deflate packer and remove both packer and piping for testing of the upper screen interval.

Initial Injectivity Evaluation (Upper Screen Interval {50'-67' bgs}):

1. Install Packer with packer pass through for transducers/water level meters. Set Packer in well blank (non-screened portion of well) between the middle and upper screen intervals. Set one pressure transducer in the lower screen zone through the packer pass through and one pressure transducer in the upper screen zone above the packer. **Record Packer length to accurately measure packer placement.**

2. Record the number of pipe segments installed to confirm packer is set to correct depth.

3. Cascade will inflate packer (record pressure) using nitrogen gas to isolate upper screen zone from middle/lower screen zones. Once inflated, record manual depth to water above packer and in pass through where pressure transducer was installed.

4. Program pressure transducers within the testing well with ID and set to record as an 'Event' using the sample frequency as defined above.

5. Ensure that all pressure transducers in surrounding wells are programmed to read at 5-minute intervals. **These can be reprogramed while packer is being set up or any time before the evaluation begins.** Document date/time and manual water level when programing surrounding well transducers. Monitor DTW in surrounding wells periodically during testing.

6. Hookup fire hose from frack tanks holding injection water to pump inlet. Ensure that fire hose has secondary containment underneath all hose connections.

7. Begin Evaluation. **Note: If water level above packer begins to rise at any point of this evaluation, packer is not sealing properly. The evaluation must be stopped, and packer needs to be reset.**
    a. Approximate Rates and Durations (**flexible**):
        i. Inject @ 9 gpm respectfully (50% design rate) for 15 minutes
        ii. Inject @ 18 gpm respectfully (100% design rate) for 15 minutes
        iii. Inject @ 27 gpm respectfully (150% design rate) for 15 minutes
        iv. Inject @ 36 gpm respectfully (200% design rate) for 15 minutes
        v. Inject @ maximum sustainable flow rate for 15 minutes if possible

8. Evaluation complete after maximum sustainable injection rate is reached where a depth to water of 10 ft or lower is maintained within water level monitoring port or otherwise directed by engineer. Stop injecting and monitor water levels manually every minute until water level is within 10% of static water level or otherwise directed by the engineer.

Injectivity Test (Upper Screen Interval {50'-67' bgs}):

1. Leaving all materials downhole, ensure that water level is within 10% of static water level or better.

2. Program pressure transducers within the testing well with ID and set to record as an 'Event' using the sample frequency as defined above.

3. Begin Injectivity Test:
    - 9 gpm respectfully (or as adjusted based on the initial injectivity evaluation) for 2 hours.
        - Record injection rate (gpm), Injection pressure (psi), manual DTW measurements (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.

    - 18 gpm respectfully (or as adjusted based on the initial injectivity evaluation) for 2 hours.
        - Record injection rate (gpm), Injection pressure (psi), manual DTW measurements (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.

    - 27 gpm respectfully (or as adjusted based on the initial injectivity evaluation) for 2 hours.
        - Record injection rate (gpm), Injection pressure (psi), manual DTW measurements (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.

    - 36 gpm respectfully (or as adjusted based on the initial injectivity evaluation) for 2 hours **if possible.**
        - Record injection rate (gpm), Injection pressure (psi), manual DTW measurements (feet btoc), and totalizer values as specified in above table.
        - Program the transducer in the pumping well using the "event" feature. See frequency above.

Note: Pumping durations may be longer than 2 hours at each pumping rate as directed by the engineer.

4. Check with QC Geologist to ensure test has been fully completed prior to stopping injections.

5. Stop injection and monitor water levels manually every minute until water level is within 10% of static water level or otherwise directed by the engineer.

6. Download pressure transducers within all testing well screen zones.

7. Download pressure transducers from all surrounding wells being monitored.

8. Deflate packer and remove both packer and piping for testing of the upper screen interval.

9. Download all pressure transducer data from the surrounding well locations and reset pressure transducers to their normal schedules. This can be done the next day as its best to let the surrounding wells equilibrate.

10. Download baro pressure transducer located at IM3 station.

Test complete.

Table [1]
Target Well Testing Rates

DRAFT

ARCADIS Design & Consultancy for natural and built assets

Well ID	Screened Interval (ft. bgs)			Maximum Flow Rate (gpm)				Testing Rates Screen 1 (gpm)				Testing Rates Screen 2 (gpm)				Testing Rates Screen 3 (gpm)			
	Screen 1	Screen 2	Screen 3	Layer 1	Layer 2	Layer 3	Layer 4	50%	100%	150%	200%	50%	100%	150%	200%	50%	100%	150%	200%
IRZ-1				80		80		40	80	120	160	40	80	120	160				
IRZ-5				80		80		40	80	120	160	40	80	120	160				
IRZ-9				80		80		40	80	120	160	40	80	120	160				
IRZ-23					70			35	70	105	140								
IRZ-11s				20	20	20	20	10	20	30	40	10	20	30	40				
IRZ-11d				20	20	20	20	10	20	30	40	10	20	30	40				
IRZ-13s				40	40	40	40	20	40	60	80	20	40	60	80				
IRZ-13d				40	40	40	40	20	40	60	80	20	40	60	80				
IRZ-15s				15	15	15	15	7.5	15	22.5	30	7.5	15	22.5	30				
IRZ-15d				15	15	15	15	7.5	15	22.5	30	7.5	15	22.5	30				
IRZ-16s				15	15	15	15	7.5	15	22.5	30	7.5	15	22.5	30				
IRZ-16d				15	15	15	15	7.5	15	22.5	30	7.5	15	22.5	30				
IRZ-17s				15	15	15	15	7.5	15	22.5	30	7.5	15	22.5	30				
IRZ-17d				15	15	15	15	7.5	15	22.5	30	7.5	15	22.5	30				
IRZ-19s				13	13	13	13	6.5	13	19.5	26	6.5	13	19.5	26				
IRZ-19d				13	13	13	13	6.5	13	19.5	26	6.5	13	19.5	26				
IRZ-20s				13	13	13	13	6.5	13	19.5	26	6.5	13	19.5	26				
IRZ-20d				13	13	13	13	6.5	13	19.5	26	6.5	13	19.5	26				
IRZ-21s				10	10	10	10	5	10	15	20	5	10	15	20				
IRZ-21d				10	10	10	10	5	10	15	20	5	10	15	20				
IRZ-25				18		18		9	18	27	36	9	18	27	36	9	18	27	36
IRZ-27				18		18		9	18	27	36	9	18	27	36				
IRZ-29				15		15		7.5	15	22.5	30	7.5	15	22.5	30				
IRZ-31				13		13		6.5	13	19.5	26	6.5	13	19.5	26				
IRZ-33				13		13		6.5	13	19.5	26	6.5	13	19.5	26				
IRZ-35					15			7.5	15	22.5	30								
IRZ-37					10			5	10	15	20								
IRZ-39					5			2.5	5	7.5	10								
RB-1				-	-	50		25	50	75	100								
RB-2				-	-	50		25	50	75	100								
RB-3				-	-	50		25	50	75	100								
RB-4				-	-	50		25	50	75	100								
RB-5				-	-	50		25	50	75	100								

Indicates deferred well

Note: adjustments to target testing rates for RB wells, IRZ-23, and IRZ-13 were made based on modeling results per discussion with Jon Roller 9/3/19

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	**IRZ-20**
Date -	**6/30/2019**
Screened Interval Tested -	**Lower Screen (137-155 ft)**
Packer Set Depth -	**124.3-128.3 ft BTOC**
Packer Seal Test -	Packer tested for leaks at top of well casing - no leaks
Tests Conducted -	4 step Specific Capacity Test (6.5, 13, 19.5, 33.5 GPM)
Purpose -	Well Performance Test
Summary -	Specific Capacity: 2.01-2.07 GPM/FT
Notes -	The IM3 system was turned off before starting spacific capacity test causing water levels to rise at the start of the test Final step was interupted due to breaker box failure and pump was shut off Final step continuted ~30 minutes after breaker failure and pump shut off

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	IRZ-20
Date -	6/30/2019
Screened Interval -	137-155
Initial Water Level Within 49-71 (Specify Screen Interval) -	42.63
Initial Water Level Within 137-155 (Specify Screen	43.83
Initial Totalizer Reading -	0
Final Totalizer Reading -	4788.36
Approx. Pumped Volume (gal) -	4788.36
Number of Specific Capacity Steps -	3
Pumping Rates (List In Order) -	6.5,13,19.5

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)
Step 1						
8:10:00	0.0	0.0	0	0.00	43.83	0
8:10:20	0.3	0.3	6.42	2.14	47.73	3.9
8:10:40	0.3	0.7	6.42	4.28	47.15	3.32
8:11:00	0.3	1.0	6.36	6.40	46.72	2.89
8:12:00	1.0	2.0	6.15	12.55	46.75	2.92
8:13:00	1.0	3.0	--	12.55	--	--
8:14:00	1.0	4.0	6.45	19.00	46.93	3.1
8:15:00	1.0	5.0	6.44	25.44	46.84	3.01
8:16:00	1.0	6.0	--	25.44	46.8	2.97
8:17:00	1.0	7.0	--	25.44	46.71	2.88
8:18:00	1.0	8.0	6.85	32.29	47.02	3.19
8:19:00	1.0	9.0	6.77	39.06	47	3.17
8:20:00	1.0	10.0	6.7	45.76	46.9	3.07
8:22:00	2.0	12.0	6.69	59.14	46.97	3.14
8:24:00	2.0	14.0	6.7	72.54	46.98	3.15
8:26:00	2.0	16.0	6.62	85.78	46.96	3.13
8:28:00	2.0	18.0	6.57	98.92	46.94	3.11
8:30:00	2.0	20.0	6.5	111.92	46.91	3.08
8:32:00	2.0	22.0	6.44	124.80	46.91	3.08
8:34:00	2.0	24.0	6.32	137.44	46.8	2.97
8:36:00	2.0	26.0	7	151.44	47.12	3.29
8:38:00	2.0	28.0	6.94	165.32	47.1	3.27
8:40:00	2.0	30.0	6.9	179.12	47.08	3.25
8:42:00	2.0	32.0	6.87	192.86	47.05	3.22
8:44:00	2.0	34.0	6.85	206.56	47.06	3.23
8:46:00	2.0	36.0	6.78	220.12	47.03	3.2
8:48:00	2.0	38.0	6.78	233.68	47.03	3.2
8:50:00	2.0	40.0	6.74	247.16	47.01	3.18
8:55:00	5.0	45.0	6.71	280.71	47.02	3.19
9:00:00	5.0	50.0	6.69	314.16	47.02	3.19
9:05:00	5.0	55.0	6.64	347.36	47.02	3.19
9:10:00	5.0	60.0	6.64	380.56	47.02	3.19
9:15:00	5.0	65.0	6.6	413.56	47.02	3.19
9:20:00	5.0	70.0	6.58	446.46	47.02	3.19
9:30:00	10.0	80.0	6.62	512.66	47.02	3.19
9:40:00	10.0	90.0	6.57	578.36	47.02	3.19
9:50:00	10.0	100.0	6.89	647.26	47.09	3.26
10:00:00	10.0	110.0	6.75	714.76	47.08	3.25
10:10:00	10.0	120.0	6.75	782.26	47.09	3.26

Total Volume Pumped (GAL):	782.26
Average Pumping Rate (GPM):	6.65
Specific Capacity (GPM/FT):	2.04

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	IRZ-20
Date -	6/30/2019
Screened Interval -	137-155
Initial Water Level Within 49-71 (Specify Screen Interval) -	42.63
Initial Water Level Within 137-155 (Specify Screen	43.83
Initial Totalizer Reading -	0
Final Totalizer Reading -	4788.36
Approx. Pumped Volume (gal) -	4788.36
Number of Specific Capacity Steps -	3
Pumping Rates (List In Order) -	6.5,13,19.5

Step 2

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 2 Start (Min)
10:10:20	0.3	120.3	12.02	786.27	48.5	4.67	0.3
10:10:40	0.3	120.7	12.92	790.57	49.79	5.96	0.7
10:11:00	0.3	121.0	12.61	794.78	49.72	5.89	1.0
10:12:00	1.0	122.0	12.77	807.55	49.94	6.11	2.0
10:13:00	1.0	123.0	13.01	820.56	50.03	6.2	3.0
10:14:00	1.0	124.0	13.12	833.68	50.14	6.31	4.0
10:15:00	1.0	125.0	13.06	846.74	50.11	6.28	5.0
10:16:00	1.0	126.0	13.32	860.06	50.31	6.48	6.0
10:17:00	1.0	127.0	13.66	873.72	50.42	6.59	7.0
10:18:00	1.0	128.0	13.7	887.42	50.44	6.61	8.0
10:19:00	1.0	129.0	13.68	901.10	50.44	6.61	9.0
10:20:00	1.0	130.0	13.66	914.76	50.3	6.47	10.0
10:22:00	2.0	132.0	13.42	941.60	50.35	6.52	12.0
10:24:00	2.0	134.0	13.41	968.42	50.33	6.5	14.0
10:26:00	2.0	136.0	13.4	995.22	50.33	6.5	16.0
10:28:00	2.0	138.0	13.4	1022.02	50.33	6.5	18.0
10:30:00	2.0	140.0	13.4	1048.82	50.33	6.5	20.0
10:32:00	2.0	142.0	13.34	1075.50	50.32	6.49	22.0
10:34:00	2.0	144.0	13.28	1102.06	50.27	6.44	24.0
10:36:00	2.0	146.0	13.26	1128.58	50.27	6.44	26.0
10:38:00	2.0	148.0	13.25	1155.08	50.28	6.45	28.0
10:40:00	2.0	150.0	13.26	1181.60	50.28	6.45	30.0
10:45:00	5.0	155.0	13.31	1248.15	50.32	6.49	35.0
10:50:00	5.0	160.0	13.28	1314.55	50.3	6.47	40.0
10:55:00	5.0	165.0	13.3	1381.05	50.31	6.48	45.0
11:00:00	5.0	170.0	13.28	1447.45	50.35	6.52	50.0
11:10:00	10.0	180.0	13.26	1580.05	50.32	6.49	60.0
11:20:00	10.0	190.0	12.96	1709.65	50.19	6.36	70.0
11:30:00	10.0	200.0	13.07	1840.35	50.37	6.54	80.0
11:40:00	10.0	210.0	13.1	1971.35	50.26	6.43	90.0
11:50:00	10.0	220.0	13.19	2103.25	50.3	6.47	100.0
12:00:00	10.0	230.0	13.1	2234.25	50.24	6.41	110.0
12:10:00	10.0	240.0	13.1	2365.25	50.28	6.45	120.0

Total Volume Pumped (GAL):	1582.74
Average Pumping Rate (GPM):	13.21
Specific Capacity (GPM/FT):	2.05

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	IRZ-20
Date -	6/30/2019
Screened Interval -	137-155
Initial Water Level Within 49-71 (Specify Screen Interval) -	42.63
Initial Water Level Within 137-155 (Specify Screen	43.83
Initial Totalizer Reading -	0
Final Totalizer Reading -	4788.36
Approx. Pumped Volume (gal) -	4788.36
Number of Specific Capacity Steps -	3
Pumping Rates (List In Order) -	6.5,13,19.5

Step 3

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 3 Start (Min)
12:10:20	0.3	240.3	19.57	2371.77	52.5	8.67	0.3
12:10:40	0.3	240.7	19.57	2378.29	53.08	9.25	0.7
12:11:00	0.3	241.0	19.57	2384.82	53.18	9.35	1.0
12:12:00	1.0	242.0	19.57	2404.39	53.32	9.49	2.0
12:13:00	1.0	243.0	19.66	2424.05	53.38	9.55	3.0
12:14:00	1.0	244.0	19.52	2443.57	53.39	9.56	4.0
12:15:00	1.0	245.0	19.42	2462.99	53.39	9.56	5.0
12:16:00	1.0	246.0	19.59	2482.58	53.43	9.6	6.0
12:17:00	1.0	247.0	19.46	2502.04	53.3	9.47	7.0
12:18:00	1.0	248.0	19.4	2521.44	53.39	9.56	8.0
12:19:00	1.0	249.0	19.67	2541.11	53.47	9.64	9.0
12:20:00	1.0	250.0	19.69	2560.80	53.49	9.66	10.0
12:22:00	2.0	252.0	19.66	2600.12	53.5	9.67	12.0
12:24:00	2.0	254.0	19.52	2639.16	53.37	9.54	14.0
12:26:00	2.0	256.0	19.77	2678.70	53.52	9.69	16.0
12:28:00	2.0	258.0	19.62	2717.94	53.54	9.71	18.0
12:30:00	2.0	260.0	19.66	2757.26	53.55	9.72	20.0
12:32:00	2.0	262.0	19.72	2796.70	53.56	9.73	22.0
12:34:00	2.0	264.0	19.75	2836.20	53.56	9.73	24.0
12:36:00	2.0	266.0	19.74	2875.68	53.56	9.73	26.0
12:38:00	2.0	268.0	19.72	2915.12	53.57	9.74	28.0
12:40:00	2.0	270.0	19.71	2954.54	53.57	9.74	30.0
12:45:00	5.0	275.0	19.76	3053.34	53.57	9.74	35.0
12:50:00	5.0	280.0	19.72	3151.94	53.58	9.75	40.0
12:55:00	5.0	285.0	19.72	3250.54	53.58	9.75	45.0
13:00:00	5.0	290.0	19.71	3349.09	53.58	9.75	50.0
13:05:00	5.0	295.0	19.66	3447.39	53.58	9.75	55.0
13:10:00	5.0	300.0	19.59	3545.34	53.55	9.72	60.0
13:20:00	10.0	310.0	19.69	3742.24	53.55	9.72	70.0
13:30:00	10.0	320.0	19.62	3938.44	53.55	9.72	80.0
13:40:00	10.0	330.0	19.63	4134.74	53.55	9.72	90.0
13:50:00	10.0	340.0	19.62	4330.94	53.55	9.72	100.0
14:00:00	10.0	350.0	19.67	4527.64	53.55	9.72	110.0
14:10:00	10.0	360.0	19.69	4724.54	53.6	9.77	120.0

Total Volume Pumped (GAL):	2359.29
Average Pumping Rate (GPM):	19.64
Specific Capacity (GPM/FT):	2.01

Step 4

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 3 Start (Min)
14:10:20	0.3	360.3	24.35	4732.65	55.78	11.95	0.3
14:10:40	0.3	360.7	25.63	4741.20	56.29	12.46	0.7
14:11:00	0.3	361.0	26.14	4749.91	56.7	12.87	1.0
14:11:30	Pump off due to breaker failure						

Total Volume Pumped (GAL):	25.37
Average Pumping Rate (GPM):	25.37
Specific Capacity (GPM/FT):	1.97

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	IRZ-20
Date -	6/30/2019
Screened Interval -	137-155
Initial Water Level Within 49-71 (Specify Screen Interval) -	42.64
Initial Water Level Within 137-155 (Specify Screen	44.06
Initial Totalizer Reading -	0
Final Totalizer Reading -	4104.04
Approx. Pumped Volume (gal) -	4104.04
Number of Specific Capacity Steps -	1
Pumping Rates (List In Order) -	~33.5

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)
Step 4 (Continued)						
14:40:00	0.0	0.0	0	0.00	44.06	0
14:40:20	0.3	0.3	34.43	11.48	--	--
14:40:40	0.3	0.7	34.43	22.95	58.3	14.24
14:41:00	0.3	1.0	34.41	34.42	59.18	15.12
14:42:00	1.0	2.0	34.4	68.82	59.97	15.91
14:43:00	1.0	3.0	34.38	103.20	60.43	16.37
14:44:00	1.0	4.0	34.38	137.58	60.55	16.49
14:45:00	1.0	5.0	34.36	171.94	60.62	16.56
14:46:00	1.0	6.0	34.36	206.30	60.67	16.61
14:47:00	1.0	7.0	34.36	240.66	60.71	16.65
14:48:00	1.0	8.0	34.36	275.02	60.73	16.67
14:49:00	1.0	9.0	34.36	309.38	60.75	16.69
14:50:00	1.0	10.0	34.36	343.74	60.76	16.7
14:52:00	2.0	12.0	33.62	410.98	60.41	16.35
14:54:00	2.0	14.0	33.6	478.18	60.41	16.35
14:56:00	2.0	16.0	33.6	545.38	60.41	16.35
14:58:00	2.0	18.0	33.58	612.54	60.42	16.36
15:00:00	2.0	20.0	33.58	679.70	60.42	16.36
15:02:00	2.0	22.0	33.58	746.86	60.45	16.39
15:04:00	2.0	24.0	33.6	814.06	60.44	16.38
15:06:00	2.0	26.0	33.58	881.22	60.45	16.39
15:08:00	2.0	28.0	33.58	948.38	60.44	16.38
15:10:00	2.0	30.0	33.58	1015.54	60.44	16.38
15:15:00	5.0	35.0	33.58	1183.44	60.44	16.38
15:20:00	5.0	40.0	33.58	1351.34	60.47	16.41
15:25:00	5.0	45.0	33.58	1519.24	60.48	16.42
15:30:00	5.0	50.0	33.58	1687.14	60.46	16.4
15:35:00	5.0	55.0	33.58	1855.04	60.44	16.38
15:40:00	5.0	60.0	33.58	2022.94	60.45	16.39
15:50:00	10.0	70.0	33.58	2358.74	60.45	16.39
16:00:00	10.0	80.0	33.58	2694.54	60.46	16.4
16:10:00	10.0	90.0	33.58	3030.34	60.46	16.4
16:20:00	10.0	100.0	33.58	3366.14	60.46	16.4
16:30:00	10.0	110.0	33.58	3701.94	60.45	16.39
16:42:00	12.0	122.0	33.58	4104.90	60.45	16.39
16:43:00	Stop pump - Test Complete					

Total Volume Pumped (GAL):	4104.90
Average Pumping Rate (GPM):	33.87
Specific Capacity (GPM/FT):	2.07

IRZ-20 Lower Screen (137-155 ft) Linear Drawdown Plot
Step 1:
Total Volume Pumped: 782.3 gal
Avg. Flow Rate: 6.65 gpm
Drawdown: 3.26 ft
Specific Capacity: 2.04 gpm/ft
Step 2:
Total Volume Pumped: 1582.7 gal
Avg. Flow Rate: 13.21 gpm
Drawdown: 6.45 ft
Specific Capacity: 2.05 gpm/ft
Step 3:
Total Volume Pumped: 2359.3 gal
Avg. Flow Rate: 19.64 gpm
Drawdown: 9.77 ft
Specific Capacity: 2.01 gpm/ft
IM3 system turned off
Legend
Transducer
Manual
Drawdown (feet)
0
2
4
6
8
10
12
14
Elapsed Time (min)
0
50
100
150
200
250
300
350
400

IRZ-20 Lower Screen (137-155 ft)
Semi-Log Drawdown Plot
Drawdown (feet)
0
2
4
6
8
10
12
14
0.01
0.1
1
10
100
Step 1 Elapsed Time (min)
Step 2 Elapsed Time (min)
Step 3 Elapsed Time (min)
Step 1:
Total Volume Pumped: 782.3 gal
Avg. Flow Rate: 6.65 gpm
Drawdown: 3.26 ft
Specific Capacity: 2.04 gpm/ft
IM3 system turned off
Step 2:
Total Volume Pumped: 1582.7 gal
Avg. Flow Rate: 13.21 gpm
Drawdown: 6.45 ft
Specific Capacity: 2.05 gpm/ft
Step 3:
Total Volume Pumped: 2359.3 gal
Avg. Flow Rate: 19.64 gpm
Drawdown: 9.77 ft
Specific Capacity: 2.01 gpm/ft
Legend
Transducer
Manual

IRZ-20 Lower Screen (137-155 ft) Semi-Log Drawdown Plot
Drawdown (feet)
0
2
4
6
8
10
12
14
16
18
0.01
0.10
1.00
10.00
100.00
1000.00
Elapsed Time (min)
Recovery Data
Legend
Transducer
Manual
Test 2:
Total Volume Pumped: 4104.9 gal
Avg. Flow Rate: 33.87 gpm
Drawdown: 16.39 ft
Specific Capacity: 2.07 gpm/ft

IRZ-20 Lower Screen (137-155 ft) Linear Drawdown Plot
Drawdown (feet)
-2
0
2
4
6
8
10
12
14
16
18
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
Elapsed Time (min)
Recovery Data
Legend
Transducer
Manual
Test 2:
Total Volume Pumped: 4104.9 gal
Avg. Flow Rate: 33.87 gpm
Drawdown: 16.39 ft
Specific Capacity: 2.07 gpm/ft

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	**IRZ-20**
Date -	**7/11/2019-7/12/2019**
Screened Interval Tested -	**Upper Screen (49-71 ft)**
Packer Set Depth -	**76.7-80.7**
Packer Seal Test -	Confirmed packer to be watertight before test
Tests Conducted -	4 step Specific Capacity Test (6.5, 13, 19.5, 33 GPM)
Purpose -	Well Performance Test
Summary -	Specific Capacity: 9.59-9.88 GPM/FT
Notes -	Step 1 had an inconsistent pumping rate at the beginning of the test Final step performed the next day

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	**IRZ-20 Upper Screen**
Date -	**7/11/2019**
Screened Interval -	**49-71**
Initial Water Level Within __49-71__ (Specify Screen Interval)	**42.36**
Initial Water Level Within ___137-155____ (Specify Screen	**41.8**
Initial Totalizer Reading -	**0**
Final Totalizer Reading -	**4871.02**
Approx. Pumped Volume (gal) -	**4871.02**
Number of Specific Capacity Steps -	**3**
Pumping Rates (List In Order) -	**6.5, 13, 19.5**

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)
Step 1						
10:50:00	0.0	0.0	0	0.00	42.36	0
10:50:20	0.3	0.3	4.5	1.50	42.93	0.57
10:50:40	0.3	0.7	5.5	3.33	42.7	0.34
10:51:00	0.3	1.0	6.6	5.53	42.81	0.45
10:52:00	1.0	2.0	5.88	11.41	42.83	0.47
10:53:00	1.0	3.0	6.84	18.25	42.89	0.53
10:54:00	1.0	4.0	6.58	24.83	42.91	0.55
10:55:00	1.0	5.0	6.46	31.29	42.91	0.55
10:56:00	1.0	6.0	6.42	37.71	42.91	0.55
10:57:00	1.0	7.0	6.32	44.03	42.91	0.55
10:58:00	1.0	8.0	6.3	50.33	42.91	0.55
10:59:00	1.0	9.0	6.24	56.57	42.91	0.55
11:00:00	1.0	10.0	6.24	62.81	42.91	0.55
11:02:00	2.0	12.0	6.26	75.33	42.91	0.55
11:04:00	2.0	14.0	6.12	87.57	42.91	0.55
11:06:00	2.0	16.0	6.07	99.71	42.91	0.55
11:08:00	2.0	18.0	7.43	114.57	43.01	0.65
11:10:00	2.0	20.0	7.28	129.13	43.01	0.65
11:12:00	2.0	22.0	7.25	143.63	43.01	0.65
11:14:00	2.0	24.0	7.04	157.71	43.01	0.65
11:16:00	2.0	26.0	7.04	171.79	43.01	0.65
11:18:00	2.0	28.0	7.04	185.87	43.01	0.65
11:20:00	2.0	30.0	6.78	199.43	43.01	0.65
11:25:00	5.0	35.0	6.75	233.18	43.01	0.65
11:30:00	5.0	40.0	6.69	266.63	43.01	0.65
11:35:00	5.0	45.0	6.6	299.63	43.01	0.65
11:40:00	5.0	50.0	6.78	333.53	43.01	0.65
11:45:00	5.0	55.0	6.67	366.88	43.01	0.65
11:50:00	5.0	60.0	6.5	399.38	43.01	0.65
12:00:00	10.0	70.0	6.42	463.58	43.01	0.65
12:10:00	10.0	80.0	6.42	527.78	43	0.64
12:20:00	10.0	90.0	6.37	591.48	43	0.64
12:30:00	10.0	100.0	6.92	660.68	43.01	0.65
12:40:00	10.0	110.0	6.87	729.38	43.04	0.68

Total Volume Pumped (GAL):	729.38
Average Pumping Rate (GPM):	6.52
Specific Capacity (GPM/FT):	9.59

Step 2							
Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 2 Start (Min)
12:50:00	10.0	120.0	12.03	849.68	43.09	0.73	0.0
12:50:20	0.3	120.3	12.87	853.97	43.3	0.94	0.3
12:50:40	0.3	120.7	12.98	858.30	43.36	1	0.7
12:51:00	0.3	121.0	12.92	862.61	43.41	1.05	1.0
12:52:00	1.0	122.0	12.9	875.51	43.42	1.06	2.0
12:53:00	1.0	123.0	12.93	888.44	43.47	1.11	3.0
12:54:00	1.0	124.0	12.93	901.37	43.49	1.13	4.0
12:55:00	1.0	125.0	12.93	914.30	43.51	1.15	5.0
12:56:00	1.0	126.0	12.92	927.22	43.53	1.17	6.0
12:57:00	1.0	127.0	12.93	940.15	43.54	1.18	7.0
12:58:00	1.0	128.0	12.92	953.07	43.54	1.18	8.0
12:59:00	1.0	129.0	12.92	965.99	43.55	1.19	9.0
13:00:00	1.0	130.0	12.9	978.89	43.55	1.19	10.0
13:02:00	2.0	132.0	13.3	1005.49	43.58	1.22	12.0
13:04:00	2.0	134.0	13.34	1032.17	43.6	1.24	14.0
13:06:00	2.0	136.0	13.34	1058.85	43.61	1.25	16.0
13:08:00	2.0	138.0	13.32	1085.49	43.61	1.25	18.0
13:10:00	2.0	140.0	13.31	1112.11	43.61	1.25	20.0
13:12:00	2.0	142.0	13.32	1138.75	43.61	1.25	22.0
13:14:00	2.0	144.0	13.32	1165.39	43.61	1.25	24.0
13:16:00	2.0	146.0	13.34	1192.07	43.61	1.25	26.0
13:18:00	2.0	148.0	13.32	1218.71	43.61	1.25	28.0
13:20:00	2.0	150.0	13.31	1245.33	43.61	1.25	30.0
13:25:00	5.0	155.0	13.34	1312.03	43.62	1.26	35.0
13:30:00	5.0	160.0	13.32	1378.63	43.62	1.26	40.0
13:35:00	5.0	165.0	13.32	1445.23	43.64	1.28	45.0
13:40:00	5.0	170.0	13.34	1511.93	43.65	1.29	50.0
13:45:00	5.0	175.0	13.32	1578.53	43.65	1.29	55.0
13:50:00	5.0	180.0	13.32	1645.13	43.65	1.29	60.0
14:00:00	10.0	190.0	13.32	1778.33	43.66	1.3	70.0
14:10:00	10.0	200.0	13.32	1911.53	43.66	1.3	80.0
14:20:00	10.0	210.0	13.34	2044.93	43.67	1.31	90.0
14:30:00	10.0	220.0	13.32	2178.13	43.67	1.31	100.0
14:40:00	10.0	230.0	13.32	2311.33	43.69	1.33	110.0

Total Volume Pumped (GAL):	1581.95
Average Pumping Rate (GPM):	13.14
Specific Capacity (GPM/FT):	9.88

Step 3							
Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 3 Start (Min)
14:50:00	10.0	240.0	20.24	2513.73	43.69	1.33	0.0
14:50:20	0.3	240.3	20.24	2520.47	43.96	1.6	0.3
14:50:40	0.3	240.7	20.18	2527.20	44.06	1.7	0.7
14:51:00	0.3	241.0	20.18	2533.93	44.11	1.75	1.0
14:52:00	1.0	242.0	20.17	2554.10	44.15	1.79	2.0
14:53:00	1.0	243.0	19.72	2573.82	44.2	1.84	3.0
14:54:00	1.0	244.0	19.7	2593.52	44.2	1.84	4.0
14:55:00	1.0	245.0	19.69	2613.21	44.21	1.85	5.0
14:56:00	1.0	246.0	19.69	2632.90	44.21	1.85	6.0
14:57:00	1.0	247.0	19.67	2652.57	44.22	1.86	7.0
14:58:00	1.0	248.0	19.69	2672.26	44.23	1.87	8.0
14:59:00	1.0	249.0	19.7	2691.96	44.24	1.88	9.0
15:00:00	1.0	250.0	19.7	2711.66	44.25	1.89	10.0
15:02:00	2.0	252.0	19.69	2751.04	44.26	1.9	12.0
15:04:00	2.0	254.0	19.7	2790.44	44.27	1.91	14.0
15:06:00	2.0	256.0	19.7	2829.84	44.27	1.91	16.0
15:08:00	2.0	258.0	19.7	2869.24	44.28	1.92	18.0
15:10:00	2.0	260.0	19.7	2908.64	44.29	1.93	20.0
15:12:00	2.0	262.0	19.67	2947.98	44.29	1.93	22.0
15:14:00	2.0	264.0	19.69	2987.36	44.29	1.93	24.0
15:16:00	2.0	266.0	19.69	3026.74	44.3	1.94	26.0
15:18:00	2.0	268.0	19.6	3065.94	44.3	1.94	28.0
15:20:00	2.0	270.0	19.66	3105.26	44.3	1.94	30.0
15:25:00	5.0	275.0	19.69	3203.71	44.31	1.95	35.0
15:30:00	5.0	280.0	19.66	3302.01	44.31	1.95	40.0
15:35:00	5.0	285.0	19.69	3400.46	44.31	1.95	45.0
15:40:00	5.0	290.0	19.64	3498.66	44.31	1.95	50.0
15:45:00	5.0	295.0	19.67	3597.01	44.32	1.96	55.0
15:50:00	5.0	300.0	19.67	3695.36	44.33	1.97	60.0
16:00:00	10.0	310.0	19.66	3891.96	44.35	1.99	70.0
16:10:00	10.0	320.0	19.66	4088.56	44.36	2	80.0
16:20:00	10.0	330.0	19.67	4285.26	44.36	2	90.0
16:30:00	10.0	340.0	19.69	4482.16	44.36	2	100.0
16:40:00	10.0	350.0	19.54	4677.56	44.4	2.04	110.0
16:50:00	10.0	360.0	19.64	4873.96	44.4	2.04	120.0
16:51:00	Complete Test						

Total Volume Pumped (GAL):	2562.63
Average Pumping Rate (GPM):	19.75
Specific Capacity (GPM/FT):	9.68

ARCADIS

Specific Capacity Testing

Location/Well ID-	**IRZ-20 Upper Screen**
Date -	**7/12/2019**
Screened Interval -	**49-71**
Initial Water Level Within __49-71__ (Specify Screen Interval)	**42.12**
Initial Water Level Within ___137-155____ (Specify Screen	**41.55**
Initial Totalizer Reading -	**0**
Final Totalizer Reading -	**4198.63 gallons**
Approx. Pumped Volume (gal) -	**4198.63 gallons**
Number of Specific Capacity Steps -	**1**
Pumping Rates (List In Order) -	**Full Pump (~33 GPM)**

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)
Step 4						
8:25:00	0.0	0.0	0	0.00	42.15	0
8:25:20	0.3	0.3	33.15	11.05	42.9	0.78
8:25:40	0.3	0.7	33.2	22.12	43.91	1.79
8:26:00	0.3	1.0	33.25	33.20	44.01	1.89
8:27:00	1.0	2.0	33.25	66.45	44.2	2.08
8:28:00	1.0	3.0	33	99.45	44.61	2.49
8:29:00	1.0	4.0	33.08	132.53	44.75	2.63
8:30:00	1.0	5.0	33.02	165.55	44.82	2.7
8:31:00	1.0	6.0	33	198.55	44.89	2.77
8:32:00	1.0	7.0	32.9	231.45	44.95	2.83
8:33:00	1.0	8.0	32.94	264.39	44.99	2.87
8:34:00	1.0	9.0	32.95	297.34	45.02	2.9
8:35:00	1.0	10.0	32.95	330.29	45.04	2.92
8:37:00	2.0	12.0	32.94	396.17	45.09	2.97
8:39:00	2.0	14.0	32.88	461.93	45.12	3
8:41:00	2.0	16.0	32.95	527.83	45.16	3.04
8:43:00	2.0	18.0	32.92	593.67	45.18	3.06
8:45:00	2.0	20.0	32.94	659.55	45.21	3.09
8:47:00	2.0	22.0	33.02	725.59	45.23	3.11
8:49:00	2.0	24.0	32.97	791.53	45.25	3.13
8:51:00	2.0	26.0	32.95	857.43	45.26	3.14
8:53:00	2.0	28.0	32.95	923.33	45.27	3.15
8:55:00	2.0	30.0	32.92	989.17	45.28	3.16
9:00:00	5.0	35.0	32.94	1153.87	45.31	3.19
9:05:00	5.0	40.0	32.94	1318.57	45.32	3.2
9:10:00	5.0	45.0	32.88	1482.97	45.35	3.23
9:15:00	5.0	50.0	32.88	1647.37	45.36	3.24
9:20:00	5.0	55.0	32.97	1812.22	45.38	3.26
9:25:00	5.0	60.0	32.94	1976.92	45.4	3.28
9:35:00	10.0	70.0	32.98	2306.72	45.41	3.29
9:45:00	10.0	80.0	32.92	2635.92	45.43	3.31
9:55:00	10.0	90.0	32.87	2964.62	45.45	3.33
10:05:00	10.0	100.0	32.92	3293.82	45.47	3.35
10:15:00	10.0	110.0	32.9	3622.82	45.48	3.36
10:25:00	10.0	120.0	32.95	3952.32	45.49	3.37

Total Volume Pumped (GAL):	3952.32
Average Pumping Rate (GPM):	32.98
Specific Capacity (GPM/FT):	9.79

IRZ-20 Upper Screen (49-71 ft) Linear Drawdown Plot
Step 1:
Total Volume Pumped: 729.4 gal
Avg. Flow Rate: 6.52 gpm
Drawdown: 0.68 ft
Specific Capacity: 9.59 gpm/ft
Step 2:
Total Volume Pumped: 1582.0 gal
Avg. Flow Rate: 13.14 gpm
Drawdown: 1.33 ft
Specific Capacity: 9.88 gpm/ft
Step 3:
Total Volume Pumped: 2562.6 gal
Avg. Flow Rate: 19.75 gpm
Drawdown: 2.04 ft
Specific Capacity: 9.68 gpm/ft
Inconsistent Pumping Rate
Legend
Transducer
Manual
Drawdown (feet)
0
0.5
1
1.5
2
2.5
Elapsed Time (min)
0
50
100
150
200
250
300
350
400

IRZ-20 Upper Screen (49-71 ft)
Semi-Log Drawdown Plot
Drawdown (feet)
0
0.5
1
1.5
2
2.5
0.01
0.1
1
10
100
Step 1 Elapsed Time (min)
Step 2 Elapsed Time (min)
Step 3 Elapsed Time (min)
Inconsistent Pumping Rate
Step 1:
Total Volume Pumped: 729.4 gal
Avg. Flow Rate: 6.52 gpm
Drawdown: 0.68 ft
Specific Capacity: 9.59 gpm/ft
Step 2:
Total Volume Pumped: 1582.0 gal
Avg. Flow Rate: 13.14 gpm
Drawdown: 1.33 ft
Specific Capacity: 9.88 gpm/ft
Step 3:
Total Volume Pumped: 2562.6 gal
Avg. Flow Rate: 19.75 gpm
Drawdown: 2.04 ft
Specific Capacity: 9.68 gpm/ft
Legend
Transducer
Manual

IRZ-20 Upper Screen (49-71 ft) Linear Drawdown Plot
Drawdown (feet)
0
0.5
1
1.5
2
2.5
3
3.5
4
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
160.00
Elapsed Time (min)
Recovery Data
Legend
Transducer
Manual
Test 2:
Total Volume Pumped: 3952.3 gal
Avg. Flow Rate: 32.98 gpm
Drawdown: 3.37 ft
Specific Capacity: 9.79 gpm/ft

IRZ-20 Upper Screen (49-71 ft) Semi-Log Drawdown Plot
Drawdown (feet)
0
0.5
1
1.5
2
2.5
3
3.5
4
0.01
0.10
1.00
10.00
100.00
1000.00
Elapsed Time (min)
Legend
Transducer
Manual
Test 2:
Total Volume Pumped: 3952.3 gal
Avg. Flow Rate: 32.98 gpm
Drawdown: 3.37 ft
Specific Capacity: 9.79 gpm/ft
Recovery Data

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	**IRZ-20**
Date -	**9/9/2019**
Screened Interval Tested -	**Lower Screen (136-155 ft)**
Packer Set Depth -	**86.5-90.5 ft bgs**
Packer Seal Test -	Confirmed packer to be watertight before test
Tests Conducted -	4 step Injectivity Test (7.5, 15, 22.5, 30 GPM Respectfully)
Purpose -	Well Performance Test
Summary -	Specific Injectivity: 1.80-1.98 GPM/FT
Notes -	Step 1 had an inconsistent injection rate at the beginning of the step.
	Transducer data in monitoring point IRZ-21 is unreliable due to a possible transducer malfunction. Manual readings are accurate.
	Possible equipment (water level meter) malfunction during Step 1.
Oversight Signature -	
Date -	1/2/2020

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	IRZ-20 (Lower)
Date -	9/9/2019
Screened Interval -	136' -155' bgs
Injection Water Source -	Fresh water from construction water supply system
Injection Outlet Depth (ft btoc) -	144.5
Packer Depth (ft btoc) -	86.5
Packer Leak Test (Pass/Fail) -	Pass
Initial Water Level Within Screen Interval 136' - 155' -	44.28
Initial Water Level Within Screen Interval 49' - 71' -	43.09
Initial Totalizer Reading -	0
Final Totalizer Reading -	9055.14
Approx. Injection Volume (gal) -	9055.14
Calculated Injection Volume (gal) -	8919.78
Calculated and Totalizer Volume Difference (gal) -	135.36
Number of Injection Steps -	4
Injection Rates (List In Order) -	7.9, 15.0, 22.1, and 30.2 GPM Respectfully

Step 1					
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)
9:10:00	0.00	0.00	0.00	44.28	0.00
9:10:20	0.33	9.88	3.29	41.52	2.76
9:10:40	0.67	8.43	6.10	41.23	3.05
9:11:00	1.00	7.77	8.69	40.99	3.29
9:12:00	2.00	7.86	16.55	40.44	3.84
9:13:00	3.00	7.86	24.41	40.36	3.92
9:14:00	4.00	7.86	32.27	40.52	3.76
9:15:00	5.00	7.9	40.17	40.48	3.80
9:16:00	6.00	7.87	48.04	40.48	3.80
9:17:00	7.00	7.86	55.90	40.47	3.81
9:18:00	8.00	7.87	63.77	40.44	3.84
9:19:00	9.00	7.86	71.63	40.46	3.82
9:20:00	10.00	7.86	79.49	40.44	3.84
9:22:00	12.00	7.86	95.21	40.43	3.85
9:24:00	14.00	7.86	110.93	40.43	3.85
9:26:00	16.00	7.98	126.89	40.43	3.85
9:28:00	18.00	7.84	142.57	40.43	3.85
9:30:00	20.00	7.84	158.25	40.43	3.85
9:32:00	22.00	7.84	173.93	40.42	3.86
9:34:00	24.00	7.82	189.57	40.42	3.86
9:38:00	28.00	7.82	220.85	40.41	3.87
9:40:00	30.00	7.80	236.45	40.42	3.86
9:45:00	35.00	7.82	275.55	40.41	3.87
9:50:00	40.00	7.82	314.65	40.44	3.84
9:55:00	45.00	7.80	353.65	39.99	4.29
10:00:00	50.00	7.92	393.25	39.99	4.29
10:05:00	55.00	7.82	432.35	39.96	4.32
10:10:00	60.00	7.84	471.55	39.96	4.32
10:20:00	70.00	--	--	39.97	4.31
10:30:00	80.00	7.80	549.55	39.89	4.39
10:40:00	90.00	7.82	627.75	40.24	4.04
10:50:00	100.00	7.74	705.15	39.94	4.34
11:00:00	110.00	7.72	782.35	39.93	4.35
11:10:00	120.00	7.54	857.75	39.88	4.40

Total Volume Injected During Step (GAL):	857.75
Average Injection Rate (GPM):	7.91
Specific Injectivity (GPM/FT):	1.80

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	**IRZ-20 (Lower)**
Date -	**9/9/2019**
Screened Interval -	**136' -155' bgs**
Injection Water Source -	**Fresh water from construction water supply system**
Injection Outlet Depth (ft btoc) -	**144.5**
Packer Depth (ft btoc) -	**86.5**
Packer Leak Test (Pass/Fail) -	**Pass**
Initial Water Level Within Screen Interval 136' - 155' -	**44.28**
Initial Water Level Within Screen Interval 49' - 71' -	**43.09**
Initial Totalizer Reading -	**0**
Final Totalizer Reading -	**9055.14**
Approx. Injection Volume (gal) -	**9055.14**
Calculated Injection Volume (gal) -	**8919.78**
Calculated and Totalizer Volume Difference (gal) -	**135.36**
Number of Injection Steps -	**4**
Injection Rates (List In Order) -	**7.9, 15.0, 22.1, and 30.2 GPM Respectfully**

Step 2						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 2 Start (Min)
11:10:20	120.33	15.00	862.75	36.65	7.63	0.00
11:10:40	120.67	14.33	867.53	37.05	7.23	0.33
11:11:00	121.00	14.90	872.49	36.92	7.36	0.67
11:12:00	122.00	14.90	887.39	36.74	7.54	1.67
11:13:00	123.00	14.98	902.37	36.72	7.56	2.67
11:14:00	124.00	15.06	917.43	36.61	7.67	3.67
11:15:00	125.00	15.06	932.49	36.58	7.70	4.67
11:16:00	126.00	15.07	947.56	36.58	7.70	5.67
11:17:00	127.00	15.07	962.63	36.57	7.71	6.67
11:18:00	128.00	15.09	977.72	36.56	7.72	7.67
11:19:00	129.00	15.07	992.79	36.57	7.71	8.67
11:20:00	130.00	15.09	1007.88	36.57	7.71	9.67
11:21:00	131.00	15.09	1022.97	36.56	7.72	10.67
11:22:00	132.00	15.09	1038.06	36.56	7.72	11.67
11:23:00	133.00	15.07	1053.13	36.56	7.72	12.67
11:28:00	138.00	15.07	1128.48	36.57	7.71	17.67
11:30:00	140.00	15.07	1158.62	36.56	7.72	19.67
11:32:00	142.00	15.07	1188.76	36.49	7.79	21.67
11:34:00	144.00	15.07	1218.90	36.51	7.77	23.67
11:36:00	146.00	15.06	1249.02	36.56	7.72	25.67
11:38:00	148.00	15.06	1279.14	36.53	7.75	27.67
11:40:00	150.00	15.07	1309.28	36.52	7.76	29.67
11:45:00	155.00	15.07	1384.63	36.52	7.76	34.67
11:50:00	160.00	15.06	1459.93	36.52	7.76	39.67
11:55:00	165.00	15.07	1535.28	36.53	7.75	44.67
12:00:00	170.00	15.06	1610.58	36.56	7.72	49.67
12:05:00	175.00	15.07	1685.93	36.55	7.73	54.67
12:10:00	180.00	15.06	1761.23	36.53	7.75	59.67
12:20:00	190.00	15.06	1911.83	36.53	7.75	69.67
12:30:00	200.00	15.04	2062.23	36.52	7.76	79.67
12:40:00	210.00	15.04	2212.63	36.54	7.74	89.67
12:50:00	220.00	15.04	2363.03	36.59	7.69	99.67
13:00:00	230.00	14.72	2510.23	36.65	7.63	109.67
13:10:00	240.00	14.74	2657.63	36.63	7.65	119.67

Total Volume Injected During Step (GAL):	1799.88
Average Injection Rate (GPM):	15.01
Specific Injectivity (GPM/FT):	1.96

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	**IRZ-20 (Lower)**
Date -	**9/9/2019**
Screened Interval -	**136' -155' bgs**
Injection Water Source -	**Fresh water from construction water supply system**
Injection Outlet Depth (ft btoc) -	**144.5**
Packer Depth (ft btoc) -	**86.5**
Packer Leak Test (Pass/Fail) -	**Pass**
Initial Water Level Within Screen Interval 136' - 155' -	**44.28**
Initial Water Level Within Screen Interval 49' - 71' -	**43.09**
Initial Totalizer Reading -	**0**
Final Totalizer Reading -	**9055.14**
Approx. Injection Volume (gal) -	**9055.14**
Calculated Injection Volume (gal) -	**8919.78**
Calculated and Totalizer Volume Difference (gal) -	**135.36**
Number of Injection Steps -	**4**
Injection Rates (List In Order) -	**7.9, 15.0, 22.1, and 30.2 GPM Respectfully**

Step 3						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 3 Start (Min)
13:10:20	240.33	18.68	2663.86	35.11	9.17	0
13:10:40	240.67	20.22	2670.60	34.27	10.01	0.33
13:11:00	241.00	21.09	2677.63	33.64	10.64	0.67
13:12:00	242.00	21.90	2699.53	33.21	11.07	1.67
13:13:00	243.00	22.24	2721.77	32.91	11.37	2.67
13:14:00	244.00	22.34	2744.11	32.83	11.45	3.67
13:15:00	245.00	22.41	2766.52	32.78	11.50	4.67
13:16:00	246.00	22.41	2788.93	32.76	11.52	5.67
13:17:00	247.00	22.41	2811.34	32.76	11.52	6.67
13:18:00	248.00	22.43	2833.77	32.76	11.52	7.67
13:19:00	249.00	22.41	2856.18	32.76	11.52	8.67
13:20:00	250.00	22.41	2878.59	32.76	11.52	9.67
13:22:00	252.00	22.41	2923.41	32.76	11.52	11.67
13:24:00	254.00	22.43	2968.27	32.76	11.52	13.67
13:26:00	256.00	22.41	3013.09	32.76	11.52	15.67
13:28:00	258.00	22.43	3057.95	32.76	11.52	17.67
13:30:00	260.00	22.43	3102.81	32.76	11.52	19.67
13:32:00	262.00	22.43	3147.67	32.76	11.52	21.67
13:34:00	264.00	22.43	3192.53	32.76	11.52	23.67
13:36:00	266.00	22.43	3237.39	32.76	11.52	25.67
13:38:00	268.00	22.43	3282.25	32.77	11.51	27.67
13:40:00	270.00	22.41	3327.07	32.75	11.53	29.67
13:45:00	275.00	22.41	3439.12	32.75	11.53	34.67
13:50:00	280.00	22.41	3551.17	32.77	11.51	39.67
13:55:00	285.00	22.40	3663.17	32.77	11.51	44.67
14:02:00	292.00	21.38	3812.83	32.77	11.51	51.67
14:05:00	295.00	22.38	3879.97	32.77	11.51	54.67
14:10:00	300.00	22.38	3991.87	32.77	11.51	59.67
14:20:00	310.00	22.40	4215.87	32.77	11.51	69.67
14:30:00	320.00	22.38	4439.67	32.77	11.51	79.67
14:40:00	330.00	22.36	4663.27	32.8	11.48	89.67
14:50:00	340.00	22.34	4886.67	32.81	11.47	99.67
15:00:00	350.00	22.33	5109.97	32.83	11.45	109.67
15:10:00	360.00	22.34	5333.37	32.83	11.45	119.67

Total Volume Injected During Step (GAL):	2675.74
Average Injection Rate (GPM):	22.14
Specific Injectivity (GPM/FT):	1.93

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	**IRZ-20 (Lower)**
Date -	**9/9/2019**
Screened Interval -	**136' -155' bgs**
Injection Water Source -	**Fresh water from construction water supply system**
Injection Outlet Depth (ft btoc) -	**144.5**
Packer Depth (ft btoc) -	**86.5**
Packer Leak Test (Pass/Fail) -	**Pass**
Initial Water Level Within Screen Interval 136' - 155' -	**44.28**
Initial Water Level Within Screen Interval 49' - 71' -	**43.09**
Initial Totalizer Reading -	**0**
Final Totalizer Reading -	**9055.14**
Approx. Injection Volume (gal) -	**9055.14**
Calculated Injection Volume (gal) -	**8919.78**
Calculated and Totalizer Volume Difference (gal) -	**135.36**
Number of Injection Steps -	**4**
Injection Rates (List In Order) -	**7.9, 15.0, 22.1, and 30.2 GPM Respectfully**

Step 4						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 4 Start (Min)
15:10:20	360.33	30.36	5343.49	32.38	11.90	0.00
15:10:40	360.67	30.34	5353.60	29.61	14.67	0.33
15:11:00	361.00	30.32	5363.71	29.18	15.10	0.67
15:12:00	362.00	30.34	5394.05	28.98	15.30	1.67
15:13:00	363.00	30.34	5424.39	28.95	15.33	2.67
15:14:00	364.00	30.36	5454.75	28.93	15.35	3.67
15:15:00	365.00	30.38	5485.13	28.92	15.36	4.67
15:16:00	366.00	30.38	5515.51	28.91	15.37	5.67
15:17:00	367.00	30.39	5545.90	28.91	15.37	6.67
15:18:00	368.00	30.39	5576.29	28.91	15.37	7.67
15:19:00	369.00	30.41	5606.70	28.91	15.37	8.67
15:20:00	370.00	30.41	5637.11	28.91	15.37	9.67
15:22:00	372.00	30.42	5697.95	28.91	15.37	11.67
15:24:00	374.00	30.42	5758.79	28.90	15.38	13.67
15:26:00	376.00	30.44	5819.67	28.90	15.38	15.67
15:28:00	378.00	30.44	5880.55	28.89	15.39	17.67
15:30:00	380.00	30.46	5941.47	28.89	15.39	19.67
15:32:00	382.00	30.48	6002.43	28.88	15.40	21.67
15:34:00	384.00	30.49	6063.41	28.88	15.40	23.67
15:36:00	386.00	30.49	6124.39	28.87	15.41	25.67
15:38:00	388.00	30.50	6185.39	28.87	15.41	27.67
15:40:00	390.00	30.52	6246.43	28.86	15.42	29.67
15:45:00	395.00	30.50	6398.93	28.85	15.43	34.67
15:50:00	400.00	30.50	6551.43	28.87	15.41	39.67
15:55:00	405.00	30.48	6703.83	28.88	15.40	44.67
16:00:00	410.00	30.46	6856.13	28.88	15.40	49.67
16:05:00	415.00	30.44	7008.33	28.90	15.38	54.67
16:10:00	420.00	30.41	7160.38	28.91	15.37	59.67
16:20:00	430.00	30.36	7463.98	28.94	15.34	69.67
16:30:00	440.00	30.31	7767.08	28.97	15.31	79.67
16:40:00	450.00	30.24	8069.48	28.97	15.31	89.67
16:50:00	460.00	30.20	8371.48	29.00	15.28	99.67
17:00:00	470.00	30.12	8672.68	29.00	15.28	109.67
17:10:00	480.00	24.71	8919.78	32.59	11.69	119.67
17:11:00	481.00	--	--	39.77	4.51	120.67
17:12:00	482.00	--	--	40.45	3.83	121.67
17:13:00	483.00	--	--	44.1	0.18	122.67
17:14:00	484.00	--	--	44.25	0.03	123.67

Total Volume Injected During Step (GAL):	3586.41
Average Injection Rate (GPM):	30.23
Specific Injectivity (GPM/FT):	1.98

IRZ-20 Lower Screen (136-155 ft) Linear Change in Water Level Plot
Change in Water Level (feet)
Elapsed Time (min)
16
14
12
10
8
6
4
2
0
-2
0
100
200
300
400
500
600
700
Step 4:
Total Volume Injected: 3586.41 gal
Avg. Injection Rate: 30.23 gpm
Change in Water Level: 15.28 ft
Specific Injectivity: 1.98 gpm/ft
Recovery Data
Legend
Transducer
Manual
Step 3:
Total Volume Injected: 2675.74 gal
Avg. Injection Rate: 22.14 gpm
Change in Water Level: 11.45 ft
Specific Injectivity: 1.93 gpm/ft
Inconsistent Early Injection Rate
Step 2:
Total Volume Injected: 1799.88 gal
Avg. Injection Rate: 15.01 gpm
Change in Water Level: 7.65 ft
Specific Injectivity: 1.96 gpm/ft
Possible equipment (water level meter) malfunction
Step 1:
Total Volume Injected: 857.75 gal
Avg. Injection Rate: 7.91 gpm
Change in Water Level: 4.4 ft
Specific Injectivity: 1.80 gpm/ft

IRZ-20 Lower Screen (136-155 ft)
Semi-Log Change in Water Level Plot

IRZ-20 Lower Screen (136-155 ft)
Semi-Log Change in Water Level Plot

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID- **IRZ-21**

Well being tested- **IRZ-20 (Lower)**

Task- **Injectivity**

Date	Time	Date+Time	Depth to Water
9/9/2019	7:49	9/9/2019 7:49	44.60
9/9/2019	8:51	9/9/2019 8:51	44.54
9/9/2019	9:47	9/9/2019 9:47	44.52
9/9/2019	11:01	9/9/2019 11:01	44.52
9/9/2019	12:03	9/9/2019 12:03	44.53
9/9/2019	13:42	9/9/2019 13:42	44.49
9/9/2019	15:44	9/9/2019 15:44	44.37
9/9/2019	17:16	9/9/2019 17:16	44.51
9/10/2019	7:40	9/10/2019 7:40	44.56
9/10/2019	8:57	9/10/2019 8:57	44.42
9/10/2019	10:13	9/10/2019 10:13	44.38
9/10/2019	11:57	9/10/2019 11:57	44.27
9/10/2019	13:46	9/10/2019 13:46	44.14
9/10/2019	15:47	9/10/2019 15:47	44.03
9/10/2019	17:34	9/10/2019 17:34	44.23

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID- **MW-31-60**

Well being tested- **IRZ-20 (Lower)**

Task- **Injectivity**

Date	Time	Date+Time	Depth to Water
9/9/2019	7:47	9/9/2019 7:47	41.57
9/9/2019	8:56	9/9/2019 8:56	41.55
9/9/2019	9:44	9/9/2019 9:44	41.55
9/9/2019	11:06	9/9/2019 11:06	41.55
9/9/2019	12:01	9/9/2019 12:01	41.54
9/9/2019	13:47	9/9/2019 13:47	41.54
9/9/2019	15:50	9/9/2019 15:50	41.56
9/9/2019	17:22	9/9/2019 17:22	41.64
9/10/2019	7:49	9/10/2019 7:49	41.52
9/10/2019	9:01	9/10/2019 9:01	41.41
9/10/2019	10:10	9/10/2019 10:10	41.33
9/10/2019	11:52	9/10/2019 11:52	41.30
9/10/2019	13:42	9/10/2019 13:42	41.30
9/10/2019	15:47	9/10/2019 15:47	41.18
9/10/2019	17:40	9/10/2019 17:40	41.32

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID- **MW-31-135**

Well being tested- **IRZ-20 (Lower)**

Task- **Injectivity**

Date	Time	Date+Time	Depth to Water
9/9/2019	7:50	9/9/2019 7:50	43.72
9/9/2019	8:54	9/9/2019 8:54	43.68
9/9/2019	9:43	9/9/2019 9:43	43.65
9/9/2019	11:03	9/9/2019 11:03	43.69
9/9/2019	11:58	9/9/2019 11:58	43.62
9/9/2019	13:44	9/9/2019 13:44	43.62
9/9/2019	15:48	9/9/2019 15:48	43.62
9/9/2019	17:19	9/9/2019 17:19	43.67
9/10/2019	7:46	9/10/2019 7:46	43.53
9/10/2019	9:05	9/10/2019 9:05	43.49
9/10/2019	10:08	9/10/2019 10:08	43.50
9/10/2019	11:54	9/10/2019 11:54	43.50
9/10/2019	15:48	9/10/2019 15:48	43.60
9/10/2019	17:37	9/10/2019 17:37	43.78

IRZ-21 Water Level During IRZ-20 Lower Screen (136-155 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-20: 71' 3"
Legend
Transducer
Manual
Initial Injectivity Evaluation
Possible Transducer malfunction
Recovery Data
Depth to Water (feet)
41
41.5
42
42.5
43
43.5
44
44.5
45
45.5
46
9/9/19 6:00
9/9/19 9:00
9/9/19 12:00
9/9/19 15:00
9/9/19 18:00
9/9/19 21:00
Elapsed Time (min)
Step 1:
Total Volume Injected: 857.75 gal
Avg. Injection Rate: 7.91 gpm
Change in Water Level in IRZ-20: 4.4 ft
Specific Injectivity: 1.80 gpm/ft
Step 2:
Total Volume Injected: 1799.88 gal
Avg. Injection Rate: 15.01 gpm
Change in Water Level in IRZ-20: 7.65 ft
Specific Injectivity: 1.96 gpm/ft
Step 3:
Total Volume Injected: 2675.74 gal
Avg. Injection Rate: 22.14 gpm
Change in Water Level in IRZ-20: 11.45 ft
Specific Injectivity: 1.93 gpm/ft
Step 4:
Total Volume Injected: 3586.41 gal
Avg. Injection Rate: 30.23 gpm
Change in Water Level in IRZ-20: 15.28 ft
Specific Injectivity: 1.98 gpm/ft

MW-31-060 Water Level During IRZ-20 Lower Screen (136-155 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-20: 111' 8"
Legend
Transducer
Manual
Initial Injectivity Evaluation
Transducer shift due to vertical movement of transducer during manual water level readings
Transducer shift due to vertical movement of transducer during manual water level readings
Recovery Data
Step 1:
Total Volume Injected: 857.75 gal
Avg. Injection Rate: 7.91 gpm
Change in Water Level in IRZ-20: 4.4 ft
Specific Injectivity: 1.80 gpm/ft
Step 2:
Total Volume Injected: 1799.88 gal
Avg. Injection Rate: 15.01 gpm
Change in Water Level in IRZ-20: 7.65 ft
Specific Injectivity: 1.96 gpm/ft
Step 3:
Total Volume Injected: 2675.74 gal
Avg. Injection Rate: 22.14 gpm
Change in Water Level in IRZ-20: 11.45 ft
Specific Injectivity: 1.93 gpm/ft
Step 4:
Total Volume Injected: 3586.41 gal
Avg. Injection Rate: 30.23 gpm
Change in Water Level in IRZ-20: 15.28 ft
Specific Injectivity: 1.98 gpm/ft
Depth to Water (feet)
41
41.2
41.4
41.6
41.8
42
42.2
42.4
42.6
42.8
43
9/9/19 6:00
9/9/19 9:00
9/9/19 12:00
9/9/19 15:00
9/9/19 18:00
9/9/19 21:00
Elapsed Time (min)

MW-31-135 Water Level During IRZ-20 Lower Screen (136-155 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-20: 72' 3"
Initial Injectivity Evaluation
Legend
Transducer
Manual
Recovery Data
Depth to Water (feet)
43
43.2
43.4
43.6
43.8
44
44.2
44.4
44.6
44.8
9/9/19 6:00
9/9/19 9:00
9/9/19 12:00
9/9/19 15:00
9/9/19 18:00
9/9/19 21:00
Elapsed Time (min)
Step 1:
Total Volume Injected: 857.75 gal
Avg. Injection Rate: 7.91 gpm
Change in Water Level in IRZ-20: 4.4 ft
Specific Injectivity: 1.80 gpm/ft
Step 2:
Total Volume Injected: 1799.88 gal
Avg. Injection Rate: 15.01 gpm
Change in Water Level in IRZ-20: 7.65 ft
Specific Injectivity: 1.96 gpm/ft
Step 3:
Total Volume Injected: 2675.74 gal
Avg. Injection Rate: 22.14 gpm
Change in Water Level in IRZ-20: 11.45 ft
Specific Injectivity: 1.93 gpm/ft
Step 4:
Total Volume Injected: 3586.41 gal
Avg. Injection Rate: 30.23 gpm
Change in Water Level in IRZ-20: 15.28 ft
Specific Injectivity: 1.98 gpm/ft

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	**IRZ-20**
Date -	**9/9/2019**
Screened Interval Tested -	**Lower Screen (136-155 ft)**
Packer Set Depth -	**86.5-90.5 ft bgs**
Packer Seal Test -	Confirmed packer to be watertight before test
Tests Conducted -	4 step Injectivity Test (7.9, 15.0, 22.1, 30.2 GPM)
Purpose -	Well Performance Test
Summary -	Specific Injectivity: 1.80-1.98 GPM/FT
Notes -	Step 1 had an inconsistent injection rate at the beginning of the test
	Possible equipment (water level meter) malfunction during Step 1 of test
Oversight Signature -	
Date -	10/8/2019

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	IRZ-20 (Lower)
Date -	9/9/2019
Screened Interval -	136-155
Injection Water Source -	Fresh water from construction water supply system
Injection Outlet Depth -	144.5 ft bgs
Depth to Packer -	86.5 ft bgs
Packer Leak Test (Pass/Fail) -	Pass
Water Level Prior to Injection -	44.28
Initial Totalizer Reading -	0
Final Totalizer Reading -	9055.14
Approx. Injection Volume (gal) -	9055.14
Calculated Injection Volume (gal) -	8919.78
Calculated and Totalizer Volume Difference (gal) -	135.36
Number of Injection Steps -	4
Injection Rates (List In Order) -	7.9, 15.0, 22.1, and 30.2

Step 1					
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)
9:10:00	0	0	0	44.28	0
9:10:20	0.33	9.88	3.29	41.52	2.76
9:10:40	0.67	8.43	6.10	41.23	3.05
9:11:00	1.00	7.77	8.69	40.99	3.29
9:12:00	2.00	7.86	16.55	40.44	3.84
9:13:00	3.00	7.86	24.41	40.36	3.92
9:14:00	4.00	7.86	32.27	40.52	3.76
9:15:00	5.00	7.9	40.17	40.48	3.8
9:16:00	6.00	7.87	48.04	40.48	3.8
9:17:00	7.00	7.86	55.90	40.47	3.81
9:18:00	8.00	7.87	63.77	40.44	3.84
9:19:00	9.00	7.86	71.63	40.46	3.82
9:20:00	10.00	7.86	79.49	40.44	3.84
9:22:00	12.00	7.86	95.21	40.43	3.85
9:24:00	14.00	7.86	110.93	40.43	3.85
9:26:00	16.00	7.98	126.89	40.43	3.85
9:28:00	18.00	7.84	142.57	40.43	3.85
9:30:00	20.00	7.84	158.25	40.43	3.85
9:32:00	22.00	7.84	173.93	40.42	3.86
9:34:00	24.00	7.82	189.57	40.42	3.86
9:38:00	28.00	7.82	220.85	40.41	3.87
9:40:00	30.00	7.8	236.45	40.42	3.86
9:45:00	35.00	7.82	275.55	40.41	3.87
9:50:00	40.00	7.82	314.65	40.44	3.84
9:55:00	45.00	7.8	353.65	39.99	4.29
10:00:00	50.00	7.92	393.25	39.99	4.29
10:05:00	55.00	7.82	432.35	39.96	4.32
10:10:00	60.00	7.84	471.55	39.96	4.32
10:20:00	70.00		471.55	39.97	4.31
10:30:00	80.00	7.8	549.55	39.89	4.39
10:40:00	90.00	7.82	627.75	40.24	4.04
10:50:00	100.00	7.74	705.15	39.94	4.34
11:00:00	110.00	7.72	782.35	39.93	4.35
11:10:00	120.00	7.54	857.75	39.88	4.4

Total Volume Injected During Step (GAL):	857.75
Average Injection Rate (GPM):	7.91
Specific Injectivity (GPM/FT):	1.80

Step 2						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 2 Start (Min)
11:10:20	120.33	15	862.75	36.65	7.63	0.0
11:10:40	120.67	14.33	867.53	37.05	7.23	0.3
11:11:00	121.00	14.9	872.50	36.92	7.36	0.7
11:12:00	122.00	14.9	887.40	36.74	7.54	1.7
11:13:00	123.00	14.98	902.38	36.72	7.56	2.7
11:14:00	124.00	15.06	917.44	36.61	7.67	3.7
11:15:00	125.00	15.06	932.50	36.58	7.7	4.7
11:16:00	126.00	15.07	947.57	36.58	7.7	5.7
11:17:00	127.00	15.07	962.64	36.57	7.71	6.7
11:18:00	128.00	15.09	977.73	36.56	7.72	7.7
11:19:00	129.00	15.07	992.80	36.57	7.71	8.7
11:20:00	130.00	15.09	1007.89	36.57	7.71	9.7
11:21:00	131.00	15.09	1022.98	36.56	7.72	10.7
11:22:00	132.00	15.09	1038.07	36.56	7.72	11.7
11:23:00	133.00	15.07	1053.14	36.56	7.72	12.7
11:28:00	138.00	15.07	1128.49	36.57	7.71	17.7
11:30:00	140.00	15.07	1158.63	36.56	7.72	19.7
11:32:00	142.00	15.07	1188.77	36.49	7.79	21.7
11:34:00	144.00	15.07	1218.91	36.51	7.77	23.7
11:36:00	146.00	15.06	1249.03	36.56	7.72	25.7
11:38:00	148.00	15.06	1279.15	36.53	7.75	27.7
11:40:00	150.00	15.07	1309.29	36.52	7.76	29.7
11:45:00	155.00	15.07	1384.64	36.52	7.76	34.7
11:50:00	160.00	15.06	1459.94	36.52	7.76	39.7
11:55:00	165.00	15.07	1535.29	36.53	7.75	44.7
12:00:00	170.00	15.06	1610.59	36.56	7.72	49.7
12:05:00	175.00	15.07	1685.94	36.55	7.73	54.7
12:10:00	180.00	15.06	1761.24	36.53	7.75	59.7
12:20:00	190.00	15.06	1911.84	36.53	7.75	69.7
12:30:00	200.00	15.04	2062.24	36.52	7.76	79.7
12:40:00	210.00	15.04	2212.64	36.54	7.74	89.7
12:50:00	220.00	15.04	2363.04	36.59	7.69	99.7
13:00:00	230.00	14.72	2510.24	36.65	7.63	109.7
13:10:00	240.00	14.74	2657.64	36.63	7.65	119.7
Total Volume Injected During Step (GAL):		1799.88				
Average Injection Rate (GPM):		15.01				
Specific Injectivity (GPM/FT):		1.96				

Step 3						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 3 Start (Min)
13:10:20	240.33	18.68	2663.86	35.11	9.17	0.0
13:10:40	240.67	20.22	2670.60	34.27	10.01	0.3
13:11:00	241.00	21.09	2677.63	33.64	10.64	0.7
13:12:00	242.00	21.9	2699.53	33.21	11.07	1.7
13:13:00	243.00	22.24	2721.77	32.91	11.37	2.7
13:14:00	244.00	22.34	2744.11	32.83	11.45	3.7
13:15:00	245.00	22.41	2766.52	32.78	11.5	4.7
13:16:00	246.00	22.41	2788.93	32.76	11.52	5.7
13:17:00	247.00	22.41	2811.34	32.76	11.52	6.7
13:18:00	248.00	22.43	2833.77	32.76	11.52	7.7
13:19:00	249.00	22.41	2856.18	32.76	11.52	8.7
13:20:00	250.00	22.41	2878.59	32.76	11.52	9.7
13:22:00	252.00	22.41	2923.41	32.76	11.52	11.7
13:24:00	254.00	22.43	2968.27	32.76	11.52	13.7
13:26:00	256.00	22.41	3013.09	32.76	11.52	15.7
13:28:00	258.00	22.43	3057.95	32.76	11.52	17.7
13:30:00	260.00	22.43	3102.81	32.76	11.52	19.7
13:32:00	262.00	22.43	3147.67	32.76	11.52	21.7
13:34:00	264.00	22.43	3192.53	32.76	11.52	23.7
13:36:00	266.00	22.43	3237.39	32.76	11.52	25.7
13:38:00	268.00	22.43	3282.25	32.77	11.51	27.7
13:40:00	270.00	22.41	3327.07	32.75	11.53	29.7
13:45:00	275.00	22.41	3439.12	32.75	11.53	34.7
13:50:00	280.00	22.41	3551.17	32.77	11.51	39.7
13:55:00	285.00	22.4	3663.17	32.77	11.51	44.7
14:02:00	292.00	21.38	3812.83	32.77	11.51	51.7
14:05:00	295.00	22.38	3879.97	32.77	11.51	54.7
14:10:00	300.00	22.38	3991.87	32.77	11.51	59.7
14:20:00	310.00	22.4	4215.87	32.77	11.51	69.7
14:30:00	320.00	22.38	4439.67	32.77	11.51	79.7
14:40:00	330.00	22.36	4663.27	32.8	11.48	89.7
14:50:00	340.00	22.34	4886.67	32.81	11.47	99.7
15:00:00	350.00	22.33	5109.97	32.83	11.45	109.7
15:10:00	360.00	22.34	5333.37	32.83	11.45	119.7
Total Volume Injected During Step (GAL):		2675.74				
Average Injection Rate (GPM):		22.14				
Specific Injectivity (GPM/FT):		1.93				

Step 4						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 4 Start (Min)
15:10:20	360.33	30.36	5343.49	32.38	11.9	0.0
15:10:40	360.67	30.34	5353.61	29.61	14.67	0.3
15:11:00	361.00	30.32	5363.71	29.18	15.1	0.7
15:12:00	362.00	30.34	5394.05	28.98	15.3	1.7
15:13:00	363.00	30.34	5424.39	28.95	15.33	2.7
15:14:00	364.00	30.36	5454.75	28.93	15.35	3.7
15:15:00	365.00	30.38	5485.13	28.92	15.36	4.7
15:16:00	366.00	30.38	5515.51	28.91	15.37	5.7
15:17:00	367.00	30.39	5545.90	28.91	15.37	6.7
15:18:00	368.00	30.39	5576.29	28.91	15.37	7.7
15:19:00	369.00	30.41	5606.70	28.91	15.37	8.7
15:20:00	370.00	30.41	5637.11	28.91	15.37	9.7
15:22:00	372.00	30.42	5697.95	28.91	15.37	11.7
15:24:00	374.00	30.42	5758.79	28.9	15.38	13.7
15:26:00	376.00	30.44	5819.67	28.9	15.38	15.7
15:28:00	378.00	30.44	5880.55	28.89	15.39	17.7
15:30:00	380.00	30.46	5941.47	28.89	15.39	19.7
15:32:00	382.00	30.48	6002.43	28.88	15.4	21.7
15:34:00	384.00	30.49	6063.41	28.88	15.4	23.7
15:36:00	386.00	30.49	6124.39	28.87	15.41	25.7
15:38:00	388.00	30.5	6185.39	28.87	15.41	27.7
15:40:00	390.00	30.52	6246.43	28.86	15.42	29.7
15:45:00	395.00	30.5	6398.93	28.85	15.43	34.7
15:50:00	400.00	30.5	6551.43	28.87	15.41	39.7
15:55:00	405.00	30.48	6703.83	28.88	15.4	44.7
16:00:00	410.00	30.46	6856.13	28.88	15.4	49.7
16:05:00	415.00	30.44	7008.33	28.9	15.38	54.7
16:10:00	420.00	30.41	7160.38	28.91	15.37	59.7
16:20:00	430.00	30.36	7463.98	28.94	15.34	69.7
16:30:00	440.00	30.31	7767.08	28.97	15.31	79.7
16:40:00	450.00	30.24	8069.48	28.97	15.31	89.7
16:50:00	460.00	30.2	8371.48	29	15.28	99.7
17:00:00	470.00	30.12	8672.68	29	15.28	109.7
17:10:00	480.00	24.71	8919.78	32.59	11.69	119.7
17:11:00	481.00	--	--	39.77	4.51	120.7
17:12:00	482.00	--	--	40.45	3.83	121.7
17:13:00	483.00	--	--	44.1	0.18	122.7
17:14:00	484.00	--	--	44.25	0.03	123.7
Total Volume Injected During Step (GAL):		3586.41				
Average Injection Rate (GPM):		30.23				
Specific Injectivity (GPM/FT):		1.98				

ARCADIS Design & Consultancy for natural and built assets

IRZ-20 Lower Screen (136-155 ft) Linear Change in Water Level Plot

ARCADIS Design & Consultancy for natural and built assets

IRZ-20 Lower Screen (136-155 ft)
Semi-Log Change in Water Level Plot

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	**IRZ-20**
Date -	**9/10/2019**
Screened Interval Tested -	**Upper Screen (49-71 ft)**
Packer Set Depth -	**86.5-90.5 ft bgs**
Packer Seal Test -	Confirmed packer to be watertight before test
Tests Conducted -	4 step Injectivity Test (7.5, 15.3, 22.5, 32.3 GPM)
Purpose -	Well Performance Test
Summary -	Specific Injectivity: 9.79-10.46 GPM/FT
Notes -	Possible drift in transducer data during Step 2
Oversight Signature -	
Date -	11/5/2019

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	IRZ-20 (Upper)
Date -	9/10/2019
Screened Interval -	49-71
Injection Water Source -	Fresh water from construction water supply system
Injection Outlet Depth -	60 ft bgs
Depth to Packer -	86.5 ft bgs
Packer Leak Test (Pass/Fail) -	Pass
Water Level Prior to Injection -	43.05
Initial Totalizer Reading -	0
Final Totalizer Reading -	9273.72
Approx. Injection Volume (gal) -	9273.72
Calculated Injection Volume (gal) -	9300.33
Calculated and Totalizer Volume Difference (gal) -	26.61
Number of Injection Steps -	4
Injection Rates (List In Order) -	7.5, 15.3, 22.5, and 32.3

Step 1					
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)
9:15:00	0	0	0	43.05	0
9:15:20	0.33	8.33	2.78	42.88	0.17
9:15:40	0.67	7.67	5.33	42.6	0.45
9:16:00	1.00	7.52	7.84	42.58	0.47
9:17:00	2.00	7.52	15.36	42.51	0.54
9:18:00	3.00	7.52	22.88	42.5	0.55
9:19:00	4.00	7.52	30.40	42.48	0.57
9:20:00	5.00	7.52	37.92	42.45	0.6
9:21:00	6.00	7.49	45.41	42.45	0.6
9:22:00	7.00	7.5	52.91	42.45	0.6
9:23:00	8.00	7.5	60.41	42.44	0.61
9:24:00	9.00	7.52	67.93	42.43	0.62
9:25:00	10.00	7.52	75.45	42.43	0.62
9:26:00	11.00	7.5	82.95	42.41	0.64
9:29:00	14.00	7.52	105.51	42.42	0.63
9:31:00	16.00	7.5	120.51	42.4	0.65
9:33:00	18.00	7.52	135.55	42.4	0.65
9:35:00	20.00	7.5	150.55	42.4	0.65
9:37:00	22.00	7.5	165.55	42.4	0.65
9:39:00	24.00	7.54	180.63	42.4	0.65
9:41:00	26.00	7.56	195.75	42.38	0.67
9:43:00	28.00	7.56	210.87	42.38	0.67
9:45:00	30.00	7.5	225.87	42.38	0.67
9:50:00	35.00	7.5	263.37	42.38	0.67
9:55:00	40.00	7.5	300.87	42.38	0.67
10:00:00	45.00	7.5	338.37	42.38	0.67
10:05:00	50.00	7.49	375.82	42.38	0.67
10:10:00	55.00	7.5	413.32	42.38	0.67
10:15:00	60.00	7.49	450.77	42.35	0.7
10:25:00	70.00	7.48	525.57	42.35	0.7
10:35:00	80.00	7.46	600.17	42.35	0.7
10:45:00	90.00	7.49	675.07	42.34	0.71
10:55:00	100.00	7.46	749.67	42.34	0.71
11:05:00	110.00	7.46	824.27	42.33	0.72
11:15:00	120.00	7.4	898.27	42.33	0.72

Total Volume Injected During Step (GAL):	898.27
Average Injection Rate (GPM):	7.53
Specific Injectivity (GPM/FT):	10.46

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	**IRZ-20 (Upper)**
Date -	**9/10/2019**
Screened Interval -	**49-71**
Injection Water Source -	**Fresh water from construction water supply system**
Injection Outlet Depth -	**60 ft bgs**
Depth to Packer -	**86.5 ft bgs**
Packer Leak Test (Pass/Fail) -	**Pass**
Water Level Prior to Injection -	**43.05**
Initial Totalizer Reading -	**0**
Final Totalizer Reading -	**9273.72**
Approx. Injection Volume (gal) -	**9273.72**
Calculated Injection Volume (gal) -	**9300.33**
Calculated and Totalizer Volume Difference (gal) -	**26.61**
Number of Injection Steps -	**4**
Injection Rates (List In Order) -	**7.5, 15.3, 22.5, and 32.3**

Step 2						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 2 Start (Min)
11:15:20	120.33	14.69	903.17	41.94	1.11	0.0
11:15:40	120.67	14.23	907.91	41.92	1.13	0.3
11:16:00	121.00	14.23	912.65	41.88	1.17	0.7
11:17:00	122.00	15.37	928.02	41.78	1.27	1.7
11:18:00	123.00	15.34	943.36	41.71	1.34	2.7
11:19:00	124.00	15.37	958.73	41.69	1.36	3.7
11:20:00	125.00	15.37	974.10	41.66	1.39	4.7
11:21:00	126.00	15.36	989.46	41.65	1.4	5.7
11:22:00	127.00	15.34	1004.80	41.64	1.41	6.7
11:23:00	128.00	--	1004.80	--	--	7.7
11:24:00	129.00	15.34	1020.14	41.63	1.42	8.7
11:25:00	130.00	15.36	1035.50	41.63	1.42	9.7
11:27:00	132.00	15.36	1066.22	41.61	1.44	11.7
11:29:00	134.00	15.34	1096.90	41.6	1.45	13.7
11:31:00	136.00	15.32	1127.54	41.59	1.46	15.7
11:33:00	138.00	15.36	1158.26	41.59	1.46	17.7
11:35:00	140.00	15.34	1188.94	41.58	1.47	19.7
11:37:00	142.00	15.38	1219.70	41.58	1.47	21.7
11:39:00	144.00	15.37	1250.44	41.58	1.47	23.7
11:41:00	146.00	15.38	1281.20	41.58	1.47	25.7
11:43:00	148.00	15.38	1311.96	41.57	1.48	27.7
11:45:00	150.00	15.38	1342.72	41.57	1.48	29.7
11:50:00	155.00	15.36	1419.52	41.57	1.48	34.7
11:55:00	160.00	15.37	1496.37	41.57	1.48	39.7
12:00:00	165.00	15.32	1572.97	41.55	1.5	44.7
12:05:00	170.00	15.36	1649.77	41.55	1.5	49.7
12:10:00	175.00	15.32	1726.37	41.55	1.5	54.7
12:15:00	180.00	15.32	1802.97	41.54	1.51	59.7
12:25:00	190.00	15.32	1956.17	41.53	1.52	69.7
12:35:00	200.00	15.22	2108.37	41.54	1.51	79.7
12:45:00	210.00	15.22	2260.57	41.53	1.52	89.7
12:55:00	220.00	15.19	2412.47	41.53	1.52	99.7
13:05:00	230.00	15.24	2564.87	41.53	1.52	109.7
13:15:00	240.00	15.24	2717.27	41.53	1.52	119.7

Total Volume Injected During Step (GAL):	1819.00
Average Injection Rate (GPM):	15.25
Specific Injectivity (GPM/FT):	10.03

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	**IRZ-20 (Upper)**
Date -	**9/10/2019**
Screened Interval -	**49-71**
Injection Water Source -	**Fresh water from construction water supply system**
Injection Outlet Depth -	**60 ft bgs**
Depth to Packer -	**86.5 ft bgs**
Packer Leak Test (Pass/Fail) -	**Pass**
Water Level Prior to Injection -	**43.05**
Initial Totalizer Reading -	**0**
Final Totalizer Reading -	**9273.72**
Approx. Injection Volume (gal) -	**9273.72**
Calculated Injection Volume (gal) -	**9300.33**
Calculated and Totalizer Volume Difference (gal) -	**26.61**
Number of Injection Steps -	**4**
Injection Rates (List In Order) -	**7.5, 15.3, 22.5, and 32.3**

Step 3						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 3 Start (Min)
13:15:20	240.33	21.12	2724.31	41.53	1.52	0.0
13:15:40	240.67	21.84	2731.59	41.35	1.7	0.3
13:16:00	241.00	22.03	2738.94	41.2	1.85	0.7
13:17:00	242.00	22.26	2761.20	41.15	1.9	1.7
13:18:00	243.00	22.28	2783.48	41.06	1.99	2.7
13:19:00	244.00	22.28	2805.76	41	2.05	3.7
13:20:00	245.00	22.36	2828.12	41	2.05	4.7
13:21:00	246.00	22.34	2850.46	40.97	2.08	5.7
13:22:00	247.00	22.34	2872.80	40.97	2.08	6.7
13:23:00	248.00	22.34	2895.14	40.95	2.1	7.7
13:24:00	249.00	22.36	2917.50	40.93	2.12	8.7
13:25:00	250.00	22.36	2939.86	40.93	2.12	9.7
13:26:00	251.00	22.36	2962.22	40.94	2.11	10.7
13:27:00	252.00	22.36	2984.58	40.91	2.14	11.7
13:28:00	253.00	22.36	3006.94	40.91	2.14	12.7
13:33:00	258.00	22.41	3118.99	40.9	2.15	17.7
13:35:00	260.00	22.4	3163.79	40.9	2.15	19.7
13:37:00	262.00	22.41	3208.61	40.89	2.16	21.7
13:39:00	264.00	22.43	3253.47	40.89	2.16	23.7
13:41:00	266.00	22.43	3298.33	40.89	2.16	25.7
13:43:00	268.00	22.44	3343.21	40.89	2.16	27.7
13:45:00	270.00	22.44	3388.09	40.89	2.16	29.7
13:50:00	275.00	22.48	3500.49	40.86	2.19	34.7
13:55:00	280.00	22.5	3612.99	40.85	2.2	39.7
14:00:00	285.00	22.51	3725.54	40.85	2.2	44.7
14:05:00	290.00	22.61	3838.59	40.83	2.22	49.7
14:10:00	295.00	22.6	3951.59	40.83	2.22	54.7
14:15:00	300.00	22.58	4064.49	40.83	2.22	59.7
14:25:00	310.00	22.53	4289.79	40.83	2.22	69.7
14:35:00	320.00	22.5	4514.79	40.84	2.21	79.7
14:45:00	330.00	22.46	4739.39	40.83	2.22	89.7
14:55:00	340.00	22.43	4963.69	40.83	2.22	99.7
15:05:00	350.00	22.41	5187.79	40.83	2.22	109.7
15:15:00	360.00	24.28	5430.59	40.79	2.26	119.7
15:15:20	360.33	24.28	5438.68	40.75	2.3	120.0
15:15:40	360.67	24.28	5446.77	40.75	2.3	120.3

Total Volume Injected During Step (GAL):	2729.50
Average Injection Rate (GPM):	22.51
Specific Injectivity (GPM/FT):	9.79

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	IRZ-20 (Upper)
Date -	9/10/2019
Screened Interval -	49-71
Injection Water Source -	Fresh water from construction water supply system
Injection Outlet Depth -	60 ft bgs
Depth to Packer -	86.5 ft bgs
Packer Leak Test (Pass/Fail) -	Pass
Water Level Prior to Injection -	43.05
Initial Totalizer Reading -	0
Final Totalizer Reading -	9273.72
Approx. Injection Volume (gal) -	9273.72
Calculated Injection Volume (gal) -	9300.33
Calculated and Totalizer Volume Difference (gal) -	26.61
Number of Injection Steps -	4
Injection Rates (List In Order) -	7.5, 15.3, 22.5, and 32.3

Step 4						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 4 Start (Min)
15:16:00	361.00	32.32	5457.55	40.5	2.55	0.3
15:17:00	362.00	32.32	5489.87	40.3	2.75	1.3
15:18:00	363.00	32.32	5522.19	40.17	2.88	2.3
15:19:00	364.00	32.32	5554.51	40.14	2.91	3.3
15:20:00	365.00	32.32	5586.83	40.1	2.95	4.3
15:21:00	366.00	32.32	5619.15	40.08	2.97	5.3
15:22:00	367.00	32.32	5651.47	40.06	2.99	6.3
15:23:00	368.00	32.34	5683.81	40.05	3	7.3
15:24:00	369.00	32.32	5716.13	40.05	3	8.3
15:25:00	370.00	32.32	5748.45	40.04	3.01	9.3
15:27:00	372.00	32.34	5813.13	40.03	3.02	11.3
15:29:00	374.00	32.36	5877.85	40.02	3.03	13.3
15:31:00	376.00	32.36	5942.57	40	3.05	15.3
15:33:00	378.00	32.38	6007.33	40	3.05	17.3
15:35:00	380.00	32.36	6072.05	40	3.05	19.3
15:37:00	382.00	32.39	6136.83	39.97	3.08	21.3
15:39:00	384.00	32.39	6201.61	39.97	3.08	23.3
15:41:00	386.00	32.4	6266.41	39.97	3.08	25.3
15:43:00	388.00	32.42	6331.25	39.97	3.08	27.3
15:45:00	390.00	32.44	6396.13	39.95	3.1	29.3
15:50:00	395.00	32.44	6558.33	39.95	3.1	34.3
15:55:00	400.00	32.42	6720.43	39.95	3.1	39.3
16:00:00	405.00	32.42	6882.53	39.94	3.11	44.3
16:05:00	410.00	32.42	7044.63	39.94	3.11	49.3
16:10:00	415.00	32.38	7206.53	39.94	3.11	54.3
16:15:00	420.00	32.36	7368.33	39.94	3.11	59.3
16:25:00	430.00	32.32	7691.53	39.94	3.11	69.3
16:35:00	440.00	32.26	8014.13	39.94	3.11	79.3
16:45:00	450.00	32.22	8336.33	39.95	3.1	89.3
16:55:00	460.00	32.16	8657.93	39.94	3.11	99.3
17:05:00	470.00	32.12	8979.13	39.95	3.1	109.3
17:15:00	480.00	32.12	9300.33	40.84	2.21	119.3

Total Volume Injected During Step (GAL):	3853.55
Average Injection Rate (GPM):	32.33
Specific Injectivity (GPM/FT):	10.43

IRZ-20 Upper Screen (49-71 ft) Linear Change in Water Level Plot
Change in Water Level (feet)
Elapsed Time (min)
0
0.5
1
1.5
2
2.5
3
3.5
0
100
200
300
400
500
600
700
Legend
Transducer
Manual
Step 1:
Step 1 Total Volume Injected: 898.27 gal
Avg. Injection Rate: 7.53 gpm
Change in Water Level: 0.72 ft
Specific Injectivity: 10.46 gpm/ft
Step 2:
Step 2 Total Volume Injected: 1819.00 gal
Avg. Injection Rate: 15.25 gpm
Change in Water Level: 1.52 ft
Specific Injectivity: 10.03 gpm/ft
Step 3:
Step 3 Total Volume Injected: 2729.50 gal
Avg. Injection Rate: 22.51 gpm
Change in Water Level: 2.3 ft
Specific Injectivity: 9.79 gpm/ft
Step 4:
Step 4 Total Volume Injected: 3853.55 gal
Avg. Injection Rate: 32.33 gpm
Change in Water Level: 3.10 ft
Specific Injectivity: 10.43 gpm/ft
Possible transducer data drift
Recovery Data

IRZ-20 Upper Screen (49-71 ft)
Semi-Log Change in Water Level Plot

IRZ-21 Water Level During IRZ-20 Upper Screen (49-71 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-20: 71' 3"
Legend
Transducer
Manual
Step 1:
Total Volume Pumped: 729.4 gal
Avg. Flow Rate: 6.52 gpm
Drawdown in IRZ-20: 0.68 ft
Specific Capacity: 9.59 gpm/ft
Step 2:
Total Volume Pumped: 2311.3 gal
Avg. Flow Rate: 13.14 gpm
Drawdown in IRZ-20: 1.33 ft
Specific Capacity: 9.88 gpm/ft
Step 3:
Total Volume Pumped: 4874.0 gal
Avg. Flow Rate: 19.75 gpm
Drawdown in IRZ-20: 2.04 ft
Specific Capacity: 9.68 gpm/ft
Step 4:
Total Volume Pumped: 3952.3 gal
Avg. Flow Rate: 32.98 gpm
Drawdown in IRZ-20: 3.37 ft
Specific Capacity: 9.79 gpm/ft
Final step performed next day
Inconsistent Pumping Rate
Recovery Data
Level (feet)
42
42.5
43
43.5
44
44.5
7/11/19 10:00
7/11/19 16:00
7/11/19 22:00
7/12/19 4:00
7/12/19 10:00
Date and Time

MW-31-060 Water Level During IRZ-20 Upper Screen (49-71 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-20: 111' 8"
Legend
Transducer
Manual
Inconsistent Pumping Rate
Transducer shift due to vertical movement of transducer during manual water level readings
Final step performed next day
Recovery Data
Step 1:
Total Volume Pumped: 729.4 gal
Avg. Flow Rate: 6.52 gpm
Drawdown in IRZ-20: 0.68 ft
Specific Capacity: 9.59 gpm/ft
Step 2:
Total Volume Pumped: 2311.3 gal
Avg. Flow Rate: 13.14 gpm
Drawdown in IRZ-20: 1.33 ft
Specific Capacity: 9.88 gpm/ft
Step 3:
Total Volume Pumped: 4874.0 gal
Avg. Flow Rate: 19.75 gpm
Drawdown in IRZ-20: 2.04 ft
Specific Capacity: 9.68 gpm/ft
Step 4:
Total Volume Pumped: 3952.3 gal
Avg. Flow Rate: 32.98 gpm
Drawdown in IRZ-20: 3.37 ft
Specific Capacity: 9.79 gpm/ft
Level (feet)
39
39.5
40
40.5
41
41.5
42
42.5
43
7/11/19 10:00
7/11/19 16:00
7/11/19 22:00
7/12/19 4:00
7/12/19 10:00
Date and Time

MW-31-135T Water Level During IRZ-20 Upper Screen (49-71 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-20: 72' 3"
Inconsistent Pumping Rate
Final step performed next day
Recovery Data
Legend
Transducer
Manual
Step 1:
Total Volume Pumped: 729.4 gal
Avg. Flow Rate: 6.52 gpm
Drawdown in IRZ-20: 0.68 ft
Specific Capacity: 9.59 gpm/ft
Step 2:
Total Volume Pumped: 2311.3 gal
Avg. Flow Rate: 13.14 gpm
Drawdown in IRZ-20: 1.33 ft
Specific Capacity: 9.88 gpm/ft
Step 3:
Total Volume Pumped: 4874.0 gal
Avg. Flow Rate: 19.75 gpm
Drawdown in IRZ-20: 2.04 ft
Specific Capacity: 9.68 gpm/ft
Step 4:
Total Volume Pumped: 3952.3 gal
Avg. Flow Rate: 32.98 gpm
Drawdown in IRZ-20: 3.37 ft
Specific Capacity: 9.79 gpm/ft
Level (feet)
41
42
43
44
45
46
47
7/11/19 10:00
7/11/19 16:00
7/11/19 22:00
7/12/19 4:00
7/12/19 10:00
Date and Time

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	**IRZ-21**
Date -	**8/24/2019**
Screened Interval Tested -	**Lower Screen (141-158 ft)**
Packer Set Depth -	**~80 ft BGS (not documented)**
Packer Seal Test -	Confirmed packer to be watertight before test
Tests Conducted -	4 step Specific Capacity Test (6.5, 15, 22.5, 30 GPM)
Purpose -	Well Performance Test
Summary -	Specific Capacity: 0.56-0.61 GPM/FT
Notes -	Inconsistent pumping rate at beginning of Step 1 Temporary pump shutdown during Step 3 due to generator issues

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	**IRZ-21 Lower**
Date -	**8/24/2019**
Screened Interval -	**141' - 158' bgs**
Initial Water Level Within 141' - 158' -	**47.52**
Initial Water Level Within 48' - 66' -	**44.34**
Initial Totalizer Reading -	**0**
Final Totalizer Reading -	**9216.78**
Approx. Pumped Volume -	**9216.78**
Number of Specific Capacity Steps -	**4**
Pumping Rates (List In Order) -	**7.5, 15, 22.5, open pump (~31)**

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)
Step 1						
9:27:00	0.0	0.0	0	0.00	47.56	0
9:30:00	3.0	0.0	0	0.00	47.53	0.01
9:30:20	0.3	0.3	3.44	1.15	54.81	7.29
9:30:40	0.3	0.7	6.94	3.46	54.33	6.81
9:31:00	0.3	1.0	7.16	5.85	57.5	9.98
9:32:00	1.0	2.0	7.56	13.41	59.09	11.57
9:33:00	1.0	3.0	7.52	20.93	59.24	11.72
9:34:00	1.0	4.0	7.5	28.43	59.33	11.81
9:35:00	1.0	5.0	7.48	35.91	59.42	11.9
9:36:00	1.0	6.0	7.48	43.39	59.38	11.86
9:37:00	1.0	7.0	7.8	51.19	59.72	12.2
9:38:00	1.0	8.0	7.8	58.99	59.8	12.28
9:39:00	1.0	9.0	7.76	66.75	59.86	12.34
9:40:00	1.0	10.0	7.76	74.51	59.9	12.38
9:42:00	2.0	12.0	7.74	89.99	59.82	12.3
9:44:00	2.0	14.0	7.74	105.47	59.84	12.32
9:46:00	2.0	16.0	7.74	120.95	59.82	12.3
9:48:00	2.0	18.0	7.74	136.43	59.83	12.31
9:50:00	2.0	20.0	7.73	151.89	59.82	12.3
9:52:00	2.0	22.0	7.72	167.33	59.82	12.3
9:54:00	2.0	24.0	7.68	182.69	59.82	12.3
9:56:00	2.0	26.0	7.68	198.05	59.81	12.29
9:58:00	2.0	28.0	7.7	213.45	59.81	12.29
10:00:00	2.0	30.0	7.68	228.81	59.81	12.29
10:05:00	5.0	35.0	7.68	267.21	59.83	12.31
10:10:00	5.0	40.0	7.68	305.61	59.82	12.3
10:15:00	5.0	45.0	7.63	343.76	59.8	12.28
10:20:00	5.0	50.0	7.63	381.91	59.78	12.26
10:25:00	5.0	55.0	7.62	420.01	59.84	12.32
10:30:00	5.0	60.0	7.62	458.11	59.82	12.3
10:40:00	10.0	70.0	7.62	534.31	59.8	12.28
10:50:00	10.0	80.0	7.62	610.51	59.83	12.31
11:00:00	10.0	90.0	7.62	686.71	59.85	12.33
11:10:00	10.0	100.0	7.62	762.91	59.84	12.32
11:20:00	10.0	110.0	7.6	838.91	59.85	12.33
11:30:00	10.0	120.0	7.62	915.11	59.86	12.34

Total Volume Pumped for Step 1 (GAL):	915.11
Average Pumping Rate (GPM):	7.50
Specific Capacity (GPM/FT):	0.61

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	**IRZ-21 Lower**
Date -	**8/24/2019**
Screened Interval -	**141' - 158' bgs**
Initial Water Level Within 141' - 158' -	**47.52**
Initial Water Level Within 48' - 66' -	**44.34**
Initial Totalizer Reading -	**0**
Final Totalizer Reading -	**9216.78**
Approx. Pumped Volume -	**9216.78**
Number of Specific Capacity Steps -	**4**
Pumping Rates (List In Order) -	**7.5, 15, 22.5, open pump (~31)**

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 2 Start (Min)
Step 2							
11:30:20	0.3	120.3	16.08	920.47	70.47	22.95	0.3
11:30:40	0.3	120.7	15.44	925.61	73.18	25.66	0.7
11:31:00	0.3	121.0	15.18	930.67	73.28	25.76	1.0
11:32:00	1.0	122.0	15.29	945.96	73.77	26.25	2.0
11:33:00	1.0	123.0	15.24	961.20	73.95	26.43	3.0
11:34:00	1.0	124.0	15.28	976.48	73.97	26.45	4.0
11:35:00	1.0	125.0	15.28	991.76	73.99	26.47	5.0
11:36:00	1.0	126.0	15.29	1007.05	74.03	26.51	6.0
11:37:00	1.0	127.0	15.26	1022.31	74.08	26.56	7.0
11:38:00	1.0	128.0	15.26	1037.57	74.07	26.55	8.0
11:39:00	1.0	129.0	15.24	1052.81	74.08	26.56	9.0
11:40:00	1.0	130.0	15.24	1068.05	74.04	26.52	10.0
11:42:00	2.0	132.0	15.24	1098.53	74.08	26.56	12.0
11:44:00	2.0	134.0	15.24	1129.01	74.07	26.55	14.0
11:46:00	2.0	136.0	15.24	1159.49	74.08	26.56	16.0
11:48:00	2.0	138.0	15.22	1189.93	74.08	26.56	18.0
11:50:00	2.0	140.0	15.24	1220.41	74.1	26.58	20.0
11:52:00	2.0	142.0	15.24	1250.89	74.11	26.59	22.0
11:54:00	2.0	144.0	15.24	1281.37	74.18	26.66	24.0
11:56:00	2.0	146.0	15.24	1311.85	74.18	26.66	26.0
11:58:00	2.0	148.0	15.26	1342.37	74.18	26.66	28.0
12:00:00	2.0	150.0	15.24	1372.85	74.16	26.64	30.0
12:05:00	5.0	155.0	15.24	1449.05	74.2	26.68	35.0
12:10:00	5.0	160.0	15.24	1525.25	74.2	26.68	40.0
12:15:00	5.0	165.0	15.22	1601.35	74.2	26.68	45.0
12:20:00	5.0	170.0	15.22	1677.45	74.18	26.66	50.0
12:25:00	5.0	175.0	15.24	1753.65	74.22	26.7	55.0
12:30:00	5.0	180.0	15.26	1829.95	74.26	26.74	60.0
12:40:00	10.0	190.0	15.24	1982.35	74.24	26.72	70.0
12:50:00	10.0	200.0	15.22	2134.55	74.23	26.71	80.0
13:00:00	10.0	210.0	15.21	2286.65	74.24	26.72	90.0
13:10:00	10.0	220.0	15.26	2439.25	74.28	26.76	100.0
13:20:00	10.0	230.0	15.26	2591.85	74.99	27.47	110.0
13:30:00	10.0	240.0	15.24	2744.25	74.34	26.82	120.0

Total Volume Pumped for Step 2 (GAL):	1829.15
Average Pumping Rate (GPM):	15.27
Specific Capacity (GPM/FT):	0.57

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	**IRZ-21 Lower**
Date -	**8/24/2019**
Screened Interval -	**141' - 158' bgs**
Initial Water Level Within 141' - 158' -	**47.52**
Initial Water Level Within 48' - 66' -	**44.34**
Initial Totalizer Reading -	**0**
Final Totalizer Reading -	**9216.78**
Approx. Pumped Volume -	**9216.78**
Number of Specific Capacity Steps -	**4**
Pumping Rates (List In Order) -	**7.5, 15, 22.5, open pump (~31)**

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 3 Start (Min)
Step 3							
13:30:20	0.3	240.3	22.1	2751.62	75.4	27.88	0.3
13:30:40	0.3	240.7	22.1	2758.99	76.16	28.64	0.7
13:31:00	0.3	241.0	22.5	2766.49	76.58	29.06	1.0
13:32:00	1.0	242.0	22.59	2789.08	78.49	30.97	2.0
13:33:00	1.0	243.0	22.58	2811.66	80.08	32.56	3.0
13:34:00	1.0	244.0	22.61	2834.27	81.11	33.59	4.0
13:35:00	1.0	245.0	22.58	2856.85	82.11	34.59	5.0
13:36:00	1.0	246.0	22.56	2879.41	83.03	35.51	6.0
13:37:00	1.0	247.0	22.54	2901.95	83.72	36.2	7.0
13:38:00	1.0	248.0	22.54	2924.49	84.2	36.68	8.0
13:39:00	1.0	249.0	22.56	2947.05	84.73	37.21	9.0
13:40:00	1.0	250.0	22.52	2969.57	85.22	37.7	10.0
13:42:00	2.0	252.0	22.54	3014.65	85.91	38.39	12.0
13:44:00	2.0	254.0	22.56	3059.77	86.45	38.93	14.0
13:46:00	2.0	256.0	22.66	3105.09	86.91	39.39	16.0
13:48:00	2.0	258.0	22.69	3150.47	87.15	39.63	18.0
13:50:00	2.0	260.0	22.56	3195.59	87.32	39.8	20.0
13:52:00	2.0	262.0	22.64	3240.87	87.39	39.87	22.0
13:54:00	2.0	264.0	22.62	3286.11	87.48	39.96	24.0
13:56:00	2.0	266.0	22.69	3331.49	87.53	40.01	26.0
13:58:00	2.0	268.0	22.66	3376.81	87.55	40.03	28.0
14:00:00	2.0	270.0	22.66	3422.13	87.61	40.09	30.0
14:05:00	5.0	275.0	22.89	3536.58	87.65	40.13	35.0
14:10:00	5.0	280.0	22.84	3650.78	87.74	40.22	40.0
14:15:00	5.0	285.0	22.92	3765.38	87.78	40.26	45.0
14:20:00	5.0	290.0	22.92	3879.98	87.83	40.31	50.0
14:25:00	5.0	295.0	22.92	3994.58	87.88	40.36	55.0
14:30:00	5.0	300.0	22.94	4109.28	87.91	40.39	60.0
14:40:00	10.0	310.0	22.98	4339.08	87.94	40.42	70.0
14:50:00	10.0	320.0	22:33	4568.48	88.02	40.5	80.0
15:00:00	10.0	330.0	22.89	4797.38	88	40.48	90.0
15:10:00	10.0	340.0	23	5027.38	88.02	40.5	100.0
15:20:00	10.0	350.0	22.5	5252.38	88.15	40.63	110.0
15:30:00	10.0	360.0	22.96	5481.98	88.12	40.6	120.0

Total Volume Pumped for Step 3 (GAL):	2737.72
Average Pumping Rate (GPM):	22.67
Specific Capacity (GPM/FT):	0.56

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	**IRZ-21 Lower**
Date -	**8/24/2019**
Screened Interval -	**141' - 158' bgs**
Initial Water Level Within 141' - 158' -	**47.52**
Initial Water Level Within 48' - 66' -	**44.34**
Initial Totalizer Reading -	**0**
Final Totalizer Reading -	**9216.78**
Approx. Pumped Volume -	**9216.78**
Number of Specific Capacity Steps -	**4**
Pumping Rates (List In Order) -	**7.5, 15, 22.5, open pump (~31)**

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 4 Start (Min)
Step 4							
15:30:20	0.3	360.3	30.62	5492.18	88.76	41.24	0.3
15:30:40	0.3	360.7	30.54	5502.36	89.44	41.92	0.7
15:31:00	0.3	361.0	30.53	5512.54	90.61	43.09	1.0
15:32:00	1.0	362.0	30.54	5543.08	92.05	44.53	2.0
15:33:00	1.0	363.0	30.64	5573.72	93.51	45.99	3.0
15:34:00	1.0	364.0	30.61	5604.33	94.85	47.33	4.0
15:35:00	1.0	365.0	30.61	5634.94	95.91	48.39	5.0
15:36:00	1.0	366.0	30.56	5665.50	96.81	49.29	6.0
15:37:00	1.0	367.0	30.54	5696.04	97.52	50	7.0
15:38:00	1.0	368.0	30.54	5726.58	98.2	50.68	8.0
15:39:00	1.0	369.0	30.43	5757.01	98.75	51.23	9.0
15:40:00	1.0	370.0	30.46	5787.47	99.24	51.72	10.0
15:42:00	2.0	372.0	30.48	5848.43	100.03	52.51	12.0
15:44:00	2.0	374.0	30.46	5909.35	100.52	53	14.0
15:46:00	2.0	376.0	30.44	5970.23	100.84	53.32	16.0
15:48:00	2.0	378.0	30.44	6031.11	101.06	53.54	18.0
15:50:00	2.0	380.0	30.48	6092.07	101.22	53.7	20.0
15:52:00	2.0	382.0	30.44	6152.95	101.22	53.7	22.0
15:54:00	2.0	384.0	30.41	6213.77	101.26	53.74	24.0
15:56:00	2.0	386.0	30.44	6274.65	101.26	53.74	26.0
15:58:00	2.0	388.0	30.4	6335.45	101.23	53.71	28.0
16:00:00	2.0	390.0	30.43	6396.31	101.27	53.75	30.0
16:05:00	5.0	395.0	30.48	6548.71	101.22	53.7	35.0
16:10:00	5.0	400.0	30.62	6701.81	101.1	53.58	40.0
16:15:00	5.0	405.0	30.76	6855.61	101.04	53.52	45.0
16:20:00	5.0	410.0	30.81	7009.66	100.95	53.43	50.0
16:25:00	5.0	415.0	30.88	7164.06	100.91	53.39	55.0
16:30:00	5.0	420.0	30.8	7318.06	100.86	53.34	60.0
16:40:00	10.0	430.0	30.82	7626.26	100.73	53.21	70.0
16:50:00	10.0	440.0	30.84	7934.66	100.68	53.16	80.0
17:00:00	10.0	450.0	30.96	8244.26	100.55	53.03	90.0
17:15:00	15.0	465.0	0	8244.26	46.64	-0.88	105.0
17:16:00	1.0	466.0	32.16	8276.42	76.87	29.35	106.0
17:17:00	1.0	467.0	32.1	8308.52	80.44	32.92	107.0
17:18:00	1.0	468.0	32.06	8340.58	82.63	35.11	108.0
17:19:00	1.0	469.0	31.9	8372.48	85.7	38.18	109.0
17:20:00	1.0	470.0	31.9	8404.38	87.8	40.28	110.0
17:25:00	5.0	475.0	31.69	8562.83	94.49	46.97	115.0
17:30:00	5.0	480.0	31.58	8720.73	97.47	49.95	120.0
17:40:00	10.0	490.0	31.49	9035.63	99.55	52.03	130.0

Total Volume Pumped for Step 4 (GAL):	3553.65
Average Pumping Rate (GPM):	30.07
Specific Capacity (GPM/FT):	0.58

IRZ-21 Lower Screen (141-158 ft) Linear Drawdown Plot
Step 1:
Step 1 Total Volume Pumped: 915.11 gal
Avg. Flow Rate: 7.50 gpm
Drawdown: 12.34 ft
Specific Capacity: 0.61 gpm/ft
Step 2:
Step 2 Total Volume Pumped: 1829.15 gal
Avg. Flow Rate: 15.27 gpm
Drawdown: 26.82 ft
Specific Capacity: 0.57 gpm/ft
Step 3:
Step 3 Total Volume Pumped: 2737.72 gal
Avg. Flow Rate: 22.67 gpm
Drawdown: 40.6 ft
Specific Capacity: 0.56 gpm/ft
Step 4:
Step 4 Total Volume Pumped: 3553.65 gal
Avg. Flow Rate: 30.07 gpm
Drawdown: 52.03 ft
Specific Capacity: 0.58 gpm/ft
Temporary Pump Shutdown
Legend
Transducer
Manual
Drawdown (feet)
0
10
20
30
40
50
60
Elapsed Time (min)
0
100
200
300
400
500
600

IRZ-21 Lower Screen (141-158 ft)
Semi-Log Drawdown Plot

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	**IRZ-21**
Date -	**8/24/2019**
Screened Interval Tested -	**Lower Screen (141-158 ft)**
Packer Set Depth -	**~80 ft BGS (not documented)**
Packer Seal Test -	Confirmed packer to be watertight before test
Tests Conducted -	4 step Specific Capacity Test (6.5, 15, 22.5, 30 GPM)
Purpose -	Well Performance Test
Summary -	Specific Capacity: 0.56-0.61 GPM/FT
Notes -	Inconsistent pumping rate at beginning of Step 1 Temporary pump shutdown during Step 3

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	**IRZ-21 Upper**
Date -	**8/26/2019**
Screened Interval -	**48' - 66'**
Initial Water Level Within 48' - 66' bgs -	**44.43**
Initial Water Level Within 141-158 bgs -	**47.82**
Initial Totalizer Reading -	**0**
Final Totalizer Reading -	**9538.24**
Approx. Pumped Volume (gal) -	**9538.24**
Number of Specific Capacity Steps -	**4**
Pumping Rates (List In Order) -	**7.5,15, 22.5, Open Pump**

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)
Step 1						
14:00:00	0.0	0.0	24.98	0.00	44.43	0
14:00:20	0.3	0.3	17.35	5.78	45.33	0.90
14:00:40	0.3	0.7	8.03	8.46	45.17	0.74
14:01:00	0.3	1.0	7.53	10.97	45.45	1.02
14:02:00	1.0	2.0	7.55	18.52	45.22	0.79
14:03:00	1.0	3.0	7.53	26.05	45.27	0.84
14:04:00	1.0	4.0	7.52	33.57	45.30	0.87
14:05:00	1.0	5.0	7.52	41.09	45.34	0.91
14:06:00	1.0	6.0	7.48	48.57	45.35	0.92
14:07:00	1.0	7.0	7.44	56.01	45.38	0.95
14:08:00	1.0	8.0	7.44	63.45	45.38	0.95
14:09:00	1.0	9.0	7.44	70.89	45.39	0.96
14:10:00	1.0	10.0	7.43	78.32	45.39	0.96
14:12:00	2.0	12.0	7.42	93.16	45.42	0.99
14:14:00	2.0	14.0	7.42	108.00	45.43	1.00
14:16:00	2.0	16.0	7.42	122.84	45.44	1.01
14:18:00	2.0	18.0	7.40	137.64	45.44	1.01
14:20:00	2.0	20.0	7.38	152.40	45.45	1.02
14:22:00	2.0	22.0	7.30	167.00	45.45	1.02
14:24:00	2.0	24.0	7.68	182.36	45.49	1.06
14:26:00	2.0	26.0	7.66	197.68	45.50	1.07
14:28:00	2.0	28.0	7.68	213.04	45.50	1.07
14:30:00	2.0	30.0	7.68	228.40	45.51	1.08
14:35:00	5.0	35.0	7.73	267.05	45.53	1.10
14:40:00	5.0	40.0	7.73	305.70	45.55	1.12
14:45:00	5.0	45.0	7.73	344.35	45.56	1.13
14:50:00	5.0	50.0	7.72	382.95	45.57	1.14
14:55:00	5.0	55.0	7.73	421.60	45.57	1.14
15:00:00	5.0	60.0	7.73	460.25	45.58	1.15
15:10:00	10.0	70.0	7.73	537.55	45.59	1.16
15:20:00	10.0	80.0	7.72	614.75	45.60	1.17
15:30:00	10.0	90.0	7.70	691.75	45.61	1.18
15:40:00	10.0	100.0	7.72	768.95	45.61	1.18
15:50:00	10.0	110.0	7.73	846.25	45.62	1.19
16:00:00	10.0	120.0	7.72	923.45	45.63	1.20

Total Volume Pumped for Step 1 (GAL):	923.45
Average Pumping Rate (GPM):	7.88
Specific Capacity (GPM/FT):	6.57

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	**IRZ-21 Upper**
Date -	**8/27/2019**
Screened Interval -	**48' - 66'**
Initial Water Level Within 48' - 66' bgs -	**44.43**
Initial Water Level Within 141-158 bgs -	**47.82**
Initial Totalizer Reading -	**0**
Final Totalizer Reading -	**9538.24**
Approx. Pumped Volume (gal) -	**9538.24**
Number of Specific Capacity Steps -	**4**
Pumping Rates (List In Order) -	**7.5,15, 22.5, Open Pump**

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)
Step 2						
8:00:00	0.0	0.0	23.51	0.00	44.39	0
8:00:20	0.3	0.3	14.30	4.77	45.47	1.04
8:00:40	0.3	0.7	14.80	9.70	45.62	1.19
8:01:00	0.3	1.0	14.89	14.66	45.77	1.34
8:02:00	1.0	2.0	15.14	29.80	45.97	1.54
8:03:00	1.0	3.0	15.12	44.92	46.07	1.64
8:04:00	1.0	4.0	15.14	60.06	46.20	1.77
8:05:00	1.0	5.0	15.14	75.20	46.26	1.83
8:06:00	1.0	6.0	15.14	90.34	46.31	1.88
8:07:00	1.0	7.0	15.14	105.48	46.35	1.92
8:08:00	1.0	8.0	15.16	120.64	46.38	1.95
8:09:00	1.0	9.0	15.14	135.78	46.42	1.99
8:10:00	1.0	10.0	15.12	150.90	46.44	2.01
8:12:00	2.0	12.0	15.12	181.14	46.46	2.03
8:14:00	2.0	14.0	15.11	211.36	46.50	2.07
8:16:00	2.0	16.0	15.11	241.58	46.52	2.09
8:18:00	2.0	18.0	15.11	271.80	46.55	2.12
8:20:00	2.0	20.0	15.09	301.98	46.55	2.12
8:22:00	2.0	22.0	15.09	332.16	46.56	2.13
8:24:00	2.0	24.0	15.09	362.34	46.58	2.15
8:26:00	2.0	26.0	15.09	392.52	46.59	2.16
8:28:00	2.0	28.0	15.09	422.70	46.60	2.17
8:30:00	2.0	30.0	15.08	452.86	46.61	2.18
8:35:00	5.0	35.0	15.08	528.26	46.63	2.20
8:40:00	5.0	40.0	15.09	603.71	46.65	2.22
8:45:00	5.0	45.0	15.08	679.11	46.67	2.24
8:50:00	5.0	50.0	15.08	754.51	46.68	2.25
8:55:00	5.0	55.0	15.04	829.71	46.70	2.27
9:00:00	5.0	60.0	15.02	904.81	46.71	2.28
9:10:00	10.0	70.0	15.06	1055.41	46.72	2.29
9:20:00	10.0	80.0	15.08	1206.21	46.75	2.32
9:30:00	10.0	90.0	15.04	1356.61	46.76	2.33
9:40:00	10.0	100.0	15.04	1507.01	46.76	2.33
9:50:00	10.0	110.0	15.08	1657.81	46.77	2.34
10:00:00	10.0	120.0	15.08	1808.61	46.80	2.37

Total Volume Pumped for Step 1 (GAL):	1808.61
Average Pumping Rate (GPM):	15.06
Specific Capacity (GPM/FT):	6.35

Step 3							
Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 2 Start (Min)
10:00:20	0.3	120.3	22.20	1816.01	47.19	2.76	0.3
10:00:40	0.3	120.7	22.25	1823.43	47.33	2.90	0.7
10:01:00	0.3	121.0	22.52	1830.94	47.45	3.02	1.0
10:02:00	1.0	122.0	22.74	1853.68	47.56	3.13	2.0
10:03:00	1.0	123.0	22.78	1876.46	47.76	3.33	3.0
10:04:00	1.0	124.0	22.72	1899.18	47.83	3.40	4.0
10:05:00	1.0	125.0	22.74	1921.92	47.87	3.44	5.0
10:06:00	1.0	126.0	22.71	1944.63	47.91	3.48	6.0
10:07:00	1.0	127.0	22.72	1967.35	47.93	3.50	7.0
10:08:00	1.0	128.0	22.74	1990.09	47.95	3.52	8.0
10:09:00	1.0	129.0	22.71	2012.80	47.96	3.53	9.0
10:10:00	1.0	130.0	22.74	2035.54	47.97	3.54	10.0
10:12:00	2.0	132.0	22.74	2081.02	48.01	3.58	12.0
10:14:00	2.0	134.0	22.76	2126.54	48.03	3.60	14.0
10:16:00	2.0	136.0	22.74	2172.02	48.04	3.61	16.0
10:18:00	2.0	138.0	22.72	2217.46	48.05	3.62	18.0
10:20:00	2.0	140.0	22.74	2262.94	48.07	3.64	20.0
10:22:00	2.0	142.0	22.71	2308.36	48.07	3.64	22.0
10:24:00	2.0	144.0	22.72	2353.80	48.08	3.65	24.0
10:26:00	2.0	146.0	22.72	2399.24	48.10	3.67	26.0
10:28:00	2.0	148.0	22.76	2444.76	48.12	3.69	28.0
10:30:00	2.0	150.0	22.76	2490.28	48.12	3.69	30.0
10:35:00	5.0	155.0	22.76	2604.08	48.13	3.70	35.0
10:40:00	5.0	160.0	22.74	2717.78	48.14	3.71	40.0
10:45:00	5.0	165.0	22.74	2831.48	48.16	3.73	45.0
10:50:00	5.0	170.0	22.78	2945.38	48.19	3.76	50.0
10:55:00	5.0	175.0	22.79	3059.33	48.20	3.77	55.0
11:00:00	5.0	180.0	22.79	3173.28	48.20	3.77	60.0
11:10:00	10.0	190.0	22.82	3401.48	48.22	3.79	70.0
11:20:00	10.0	200.0	22.86	3630.08	48.25	3.82	80.0
11:30:00	10.0	210.0	22.84	3858.48	48.26	3.83	90.0
11:40:00	10.0	220.0	22.82	4086.68	48.28	3.85	100.0
11:50:00	10.0	230.0	22.86	4315.28	48.30	3.87	110.0
12:00:00	10.0	240.0	22.89	4544.18	48.30	3.87	120.0
Total Volume Pumped for Step 2 (GAL):			2735.56				
Average Pumping Rate (GPM):			22.72				
Specific Capacity (GPM/FT):			5.87				

Step 4							
Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 3 Start (Min)
12:00:20	0.3	240.3	33.70	4555.41	48.79	4.36	0.3
12:00:40	0.3	240.7	33.68	4566.64	49.18	4.75	0.7
12:01:00	0.3	241.0	33.68	4577.86	49.27	4.84	1.0
12:02:00	1.0	242.0	33.66	4611.52	49.68	5.25	2.0
12:03:00	1.0	243.0	33.68	4645.20	49.85	5.42	3.0
12:04:00	1.0	244.0	33.66	4678.86	49.96	5.53	4.0
12:05:00	1.0	245.0	33.65	4712.51	50.03	5.60	5.0
12:06:00	1.0	246.0	33.68	4746.19	50.07	5.64	6.0
12:07:00	1.0	247.0	33.72	4779.91	50.11	5.68	7.0
12:08:00	1.0	248.0	33.70	4813.61	50.15	5.72	8.0
12:09:00	1.0	249.0	33.70	4847.31	50.18	5.75	9.0
12:10:00	1.0	250.0	33.68	4880.99	50.19	5.76	10.0
12:12:00	2.0	252.0	33.72	4948.43	50.24	5.81	12.0
12:14:00	2.0	254.0	33.70	5015.83	50.27	5.84	14.0
12:16:00	2.0	256.0	33.72	5083.27	50.29	5.86	16.0
12:18:00	2.0	258.0	33.75	5150.77	50.32	5.89	18.0
12:20:00	2.0	260.0	33.66	5218.09	50.33	5.90	20.0
12:24:00	4.0	264.0	33.75	5353.09	50.36	5.93	24.0
12:26:00	2.0	266.0	33.73	5420.55	50.39	5.96	26.0
12:28:00	2.0	268.0	33.73	5488.01	50.40	5.97	28.0
12:30:00	2.0	270.0	33.73	5555.47	50.41	5.98	30.0
12:35:00	5.0	275.0	33.73	5724.12	50.43	6.00	35.0
12:40:00	5.0	280.0	33.73	5892.77	50.46	6.03	40.0
12:45:00	5.0	285.0	33.72	6061.37	50.47	6.04	45.0
12:50:00	5.0	290.0	33.70	6229.87	50.48	6.05	50.0
12:55:00	5.0	295.0	33.66	6398.17	50.49	6.06	55.0
13:10:00	15.0	310.0	33.72	6903.97	50.55	6.12	70.0
13:20:00	10.0	320.0	33.56	7239.57	50.56	6.13	80.0
13:30:00	10.0	330.0	33.56	7575.17	50.58	6.15	90.0
13:40:00	10.0	340.0	33.54	7910.57	50.59	6.16	100.0
13:50:00	10.0	350.0	33.00	8240.57	50.62	6.19	110.0
14:00:00	10.0	360.0	33.58	8576.37	50.66	6.23	120.0
Total Volume Pumped for Step 3 (GAL):			4032.2				
Average Pumping Rate (GPM):			33.66				
Specific Capacity (GPM/FT):			5.40				

IRZ-21 Upper Screen (48-66 ft) Linear Drawdown Plot
Drawdown (feet)
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
1.2
1.4
0
50
100
150
200
250
300
Elapsed Time (min)
Legend
Transducer
Manual
Recovery Data
Step 1:
Step 1 Total Volume Pumped: 923.45 gal
Avg. Flow Rate: 7.88 gpm
Drawdown: 1.20 ft
Specific Capacity: 6.57 gpm/ft

IRZ-21 Upper Screen (48-66 ft) Semi-Log Drawdown Plot
Drawdown (feet)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
0.01
0.10
1.00
10.00
100.00
1000.00
Step 1 Elapsed Time (min)
Recovery Data
Inconsistent Pumping Rate
Step 1:
Step 1 Total Volume Pumped: 923.45 gal
Avg. Flow Rate: 7.88 gpm
Drawdown: 1.20 ft
Specific Capacity: 6.57 gpm/ft
Legend
Transducer
Manual

IRZ-21 Upper Screen (48-66 ft) Linear Drawdown Plot
Step 2:
Step 2 Total Volume Pumped: 1808.6 gal
Avg. Flow Rate: 15.06 gpm
Drawdown: 2.37 ft
Specific Capacity: 6.35 gpm/ft
Recovery Data
Step 3:
Step 3 Total Volume Pumped: 2735.6 gal
Avg. Flow Rate: 22.72 gpm
Drawdown: 3.87 ft
Specific Capacity: 5.87 gpm/ft
Legend
Transducer
Manual
Step 4:
Step 4 Total Volume Pumped: 4032.2 gal
Avg. Flow Rate: 33.66 gpm
Drawdown: 6.23 ft
Specific Capacity: 5.40 gpm/ft
Drawdown (feet)
0
1
2
3
4
5
6
7
0.00
50.00
100.00
150.00
200.00
250.00
300.00
350.00
400.00
450.00
Elapsed Time (min)

IRZ-21 Upper Screen (48-66 ft)
Semi-Log Drawdown Plot

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	**IRZ-21**
Date -	**9/7/2019**
Screened Interval Tested -	**Upper Screen (48-66 ft)**
Packer Set Depth -	**75-79 ft bgs**
Packer Seal Test -	Confirmed packer to be watertight before test
Tests Conducted -	4 step Injectivity Test (7.7, 15.2, 22.4, 30.6 GPM)
Purpose -	Well Performance Test
Summary -	Specific Injectivity: 7.93-8.15 GPM/FT
Notes -	IM3 system shut off before test started and was brought back online during the first step of test.
	Possible user error in collecting manual water levels in IRZ-21 at 8:42 and in IRZ-23
	Possible data drift from transducer during Step 2
Oversight Signature -	
Date -	1/3/2020

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	**IRZ-21 (Upper)**
Date -	**9/7/2019**
Screened Interval -	**48'-66' bgs**
Injection Water Source -	**Fresh water from construction water supply system**
Injection Outlet Depth -	**150 ft bgs**
Depth to Packer -	**75 ft bgs**
Packer Leak Test (Pass/Fail) -	**Pass**
Water Level Prior to Injection (ft btoc) -	**44.19**
Initial Totalizer Reading -	**0**
Final Totalizer Reading -	**9110.72**
Approx. Injection Volume (gal) -	**9110.72**
Calculated Injection Volume (gal) -	**9190.89**
Calculated and Totalizer Volume Difference (gal) -	**80.17**
Number of Injection Steps -	**4**
Injection Rates (List In Order) -	**7.5, 15, 22.5, 30 GPM Respectfully**

Step 1					
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)
8:40:00	0	0	0	44.19	0
8:40:20	0.33	11.20	3.73	44.50	-0.31
8:40:40	0.67	6.90	6.03	43.65	0.54
8:41:00	1.00	7.86	8.65	43.51	0.68
8:42:00	2.00	7.71	16.36	41.80	2.39
8:43:00	3.00	7.69	24.05	43.35	0.84
8:44:00	4.00	7.68	31.73	43.31	0.88
8:45:00	5.00	7.66	39.39	43.18	1.01
8:46:00	6.00	7.68	47.07	43.26	0.93
8:47:00	7.00	7.66	54.73	43.22	0.97
8:48:00	8.00	7.66	62.39	43.22	0.97
8:49:00	9.00	7.66	70.05	43.18	1.01
8:50:00	10.00	7.64	77.69	43.17	1.02
8:52:00	12.00	7.66	93.01	43.15	1.04
8:54:00	14.00	7.66	108.33	43.11	1.08
8:56:00	16.00	7.68	123.69	43.12	1.07
8:58:00	18.00	7.68	139.05	43.09	1.10
9:00:00	20.00	7.66	154.37	43.08	1.11
9:02:00	22.00	7.66	169.69	43.09	1.10
9:04:00	24.00	7.66	185.01	43.07	1.12
9:06:00	26.00	7.66	200.33	43.07	1.12
9:08:00	28.00	7.66	215.65	43.07	1.12
9:10:00	30.00	7.66	230.97	43.06	1.13
9:15:00	35.00	7.66	269.27	43.03	1.16
9:20:00	40.00	7.66	307.57	43.00	1.19
9:25:00	45.00	7.66	345.87	42.99	1.20
9:30:00	50.00	7.64	384.07	42.99	1.20
9:35:00	55.00	7.66	422.37	42.98	1.21
9:40:00	60.00	7.66	460.67	42.97	1.22
9:50:00	70.00	7.64	537.07	43.02	1.17
10:00:00	80.00	7.54	612.47	43.10	1.09
10:10:00	90.00	7.54	687.87	43.04	1.15
10:20:00	100.00	7.54	763.27	43.18	1.01
10:30:00	110.00	7.52	838.47	43.23	0.96

Total Volume Injected During Step (GAL):	838.47
Average Injection Rate (GPM):	7.74
Specific Injectivity (GPM/FT):	8.06

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	**IRZ-21 (Upper)**
Date -	**9/7/2019**
Screened Interval -	**48'-66' bgs**
Injection Water Source -	**Fresh water from construction water supply system**
Injection Outlet Depth -	**150 ft bgs**
Depth to Packer -	**75 ft bgs**
Packer Leak Test (Pass/Fail) -	**Pass**
Water Level Prior to Injection (ft btoc) -	**44.19**
Initial Totalizer Reading -	**0**
Final Totalizer Reading -	**9110.72**
Approx. Injection Volume (gal) -	**9110.72**
Calculated Injection Volume (gal) -	**9190.89**
Calculated and Totalizer Volume Difference (gal) -	**80.17**
Number of Injection Steps -	**4**
Injection Rates (List In Order) -	**7.5, 15, 22.5, 30 GPM Respectfully**

Step 2						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 2 Start (Min)
10:40:20	120.33	14.46	987.89	42.80	1.39	0
10:40:40	120.67	12.16	991.95	42.82	1.37	0.33
10:41:00	121.00	14.48	996.77	42.73	1.46	0.67
10:42:00	122.00	15.36	1012.13	42.49	1.70	1.67
10:43:00	123.00	15.46	1027.59	42.41	1.78	2.67
10:44:00	124.00	15.48	1043.07	42.37	1.82	3.67
10:45:00	125.00	14.72	1057.79	42.36	1.83	4.67
10:46:00	126.00	14.81	1072.60	42.37	1.82	5.67
10:47:00	127.00	15.67	1088.27	42.31	1.88	6.67
10:48:00	128.00	15.36	1103.63	42.30	1.89	7.67
10:49:00	129.00	15.36	1118.99	42.30	1.89	8.67
10:50:00	130.00	15.34	1134.33	42.28	1.91	9.67
10:52:00	132.00	15.34	1165.01	42.27	1.92	11.67
10:54:00	134.00	15.34	1195.69	42.29	1.90	13.67
10:56:00	136.00	15.28	1226.25	42.28	1.91	15.67
10:58:00	138.00	15.30	1256.85	42.27	1.92	17.67
11:00:00	140.00	15.32	1287.49	42.26	1.93	19.67
11:02:00	142.00	15.34	1318.17	42.26	1.93	21.67
11:04:00	144.00	15.28	1348.73	42.26	1.93	23.67
11:06:00	146.00	15.34	1379.41	42.24	1.95	25.67
11:08:00	148.00	15.34	1410.09	42.24	1.95	27.67
11:10:00	150.00	15.34	1440.77	42.25	1.94	29.67
11:15:00	155.00	15.32	1517.37	42.26	1.93	34.67
11:20:00	160.00	15.32	1593.97	42.27	1.92	39.67
11:25:00	165.00	15.27	1670.32	42.26	1.93	44.67
11:30:00	170.00	15.30	1746.82	42.25	1.94	49.67
11:35:00	175.00	15.32	1823.42	42.27	1.92	54.67
11:40:00	180.00	15.27	1899.77	42.27	1.92	59.67
11:50:00	190.00	15.27	2052.47	42.28	1.91	69.67
12:00:00	200.00	15.27	2205.17	42.28	1.91	79.67
12:10:00	210.00	15.24	2357.57	42.28	1.91	89.67
12:20:00	220.00	15.22	2509.77	42.28	1.91	99.67
12:30:00	230.00	15.26	2662.37	42.28	1.91	109.67
12:40:00	240.00	15.26	2814.97	42.28	1.91	119.67

Total Volume Injected During Step (GAL):	1976.50
Average Injection Rate (GPM):	15.15
Specific Injectivity (GPM/FT):	7.93

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	**IRZ-21 (Upper)**
Date -	**9/7/2019**
Screened Interval -	**48'-66' bgs**
Injection Water Source -	**Fresh water from construction water supply system**
Injection Outlet Depth -	**150 ft bgs**
Depth to Packer -	**75 ft bgs**
Packer Leak Test (Pass/Fail) -	**Pass**
Water Level Prior to Injection (ft btoc) -	**44.19**
Initial Totalizer Reading -	**0**
Final Totalizer Reading -	**9110.72**
Approx. Injection Volume (gal) -	**9110.72**
Calculated Injection Volume (gal) -	**9190.89**
Calculated and Totalizer Volume Difference (gal) -	**80.17**
Number of Injection Steps -	**4**
Injection Rates (List In Order) -	**7.5, 15, 22.5, 30 GPM Respectfully**

Step 3						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 3 Start (Min)
12:40:20	240.33	19.24	2821.39	42.11	2.08	0
12:40:40	240.67	20.4	2828.19	41.98	2.21	0.33
12:41:00	241.00	23.76	2836.11	41.71	2.48	0.67
12:42:00	242.00	22.32	2858.43	41.67	2.52	1.67
12:43:00	243.00	22.34	2880.77	41.61	2.58	2.67
12:44:00	244.00	21.94	2902.71	41.59	2.60	3.67
12:45:00	245.00	21.88	2924.59	41.58	2.61	4.67
12:46:00	246.00	22.36	2946.95	41.57	2.62	5.67
12:47:00	247.00	23.04	2969.99	41.49	2.70	6.67
12:48:00	248.00	23.04	2993.03	41.47	2.72	7.67
12:49:00	249.00	22.26	3015.29	41.48	2.71	8.67
12:50:00	250.00	22.33	3037.62	41.54	2.65	9.67
12:52:00	252.00	22.32	3082.26	41.49	2.70	11.67
12:54:00	254.00	22.34	3126.94	41.49	2.70	13.67
12:56:00	256.00	22.30	3171.54	41.46	2.73	15.67
12:58:00	258.00	22.61	3216.76	41.46	2.73	17.67
13:00:00	260.00	22.61	3261.98	41.46	2.73	19.67
13:02:00	262.00	22.62	3307.22	41.46	2.73	21.67
13:04:00	264.00	22.64	3352.50	41.45	2.74	23.67
13:06:00	266.00	22.54	3397.58	41.45	2.74	25.67
13:08:00	268.00	22.54	3442.66	41.46	2.73	27.67
13:10:00	270.00	22.56	3487.78	41.46	2.73	29.67
13:15:00	275.00	22.56	3600.58	41.41	2.78	34.67
13:20:00	280.00	22.62	3713.68	41.41	2.78	39.67
13:25:00	285.00	22.34	3825.38	41.43	2.76	44.67
13:30:00	290.00	22.41	3937.43	41.42	2.77	49.67
13:35:00	295.00	22.43	4049.58	41.42	2.77	54.67
13:40:00	300.00	22.41	4161.63	41.41	2.78	59.67
13:50:00	310.00	22.36	4385.23	41.41	2.78	69.67
14:00:00	320.00	22.33	4608.53	41.43	2.76	79.67
14:10:00	330.00	22.71	4835.63	41.40	2.79	89.67
14:20:00	340.00	22.74	5063.03	41.40	2.79	99.67
14:30:00	350.00	22.81	5291.13	41.40	2.79	109.67
14:40:00	360.00	22.88	5519.93	41.38	2.81	119.67

Total Volume Injected During Step (GAL):	2704.95
Average Injection Rate (GPM):	22.37
Specific Injectivity (GPM/FT):	7.96

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	**IRZ-21 (Upper)**
Date -	**9/7/2019**
Screened Interval -	**48'-66' bgs**
Injection Water Source -	**Fresh water from construction water supply system**
Injection Outlet Depth -	**150 ft bgs**
Depth to Packer -	**75 ft bgs**
Packer Leak Test (Pass/Fail) -	**Pass**
Water Level Prior to Injection (ft btoc) -	**44.19**
Initial Totalizer Reading -	**0**
Final Totalizer Reading -	**9110.72**
Approx. Injection Volume (gal) -	**9110.72**
Calculated Injection Volume (gal) -	**9190.89**
Calculated and Totalizer Volume Difference (gal) -	**80.17**
Number of Injection Steps -	**4**
Injection Rates (List In Order) -	**7.5, 15, 22.5, 30 GPM Respectfully**

Step 4						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 4 Start (Min)
14:40:20	360.33	30.70	5530.16	40.94	3.25	0
14:40:40	360.67	30.70	5540.39	40.90	3.29	0.33
14:41:00	361.00	30.72	5550.63	40.82	3.37	0.67
14:42:00	362.00	30.70	5581.33	40.70	3.49	1.67
14:43:00	363.00	30.70	5612.03	40.67	3.52	2.67
14:44:00	364.00	30.72	5642.75	40.61	3.58	3.67
14:45:00	365.00	30.70	5673.45	40.58	3.61	4.67
14:46:00	366.00	30.70	5704.15	40.57	3.62	5.67
14:47:00	367.00	30.69	5734.84	40.57	3.62	6.67
14:48:00	368.00	30.69	5765.53	40.54	3.65	7.67
14:49:00	369.00	30.69	5796.22	40.56	3.63	8.67
14:50:00	370.00	30.68	5826.90	40.53	3.66	9.67
14:51:00	371.00	30.66	5857.56	40.52	3.67	10.67
14:54:00	374.00	30.66	5949.54	40.49	3.70	13.67
14:56:00	376.00	30.66	6010.86	40.48	3.71	15.67
14:58:00	378.00	30.64	6072.14	40.49	3.70	17.67
15:00:00	380.00	30.62	6133.38	40.48	3.71	19.67
15:02:00	382.00	30.64	6194.66	40.47	3.72	21.67
15:04:00	384.00	30.62	6255.90	40.47	3.72	23.67
15:06:00	386.00	30.64	6317.18	40.46	3.73	25.67
15:08:00	388.00	30.62	6378.42	40.47	3.72	27.67
15:10:00	390.00	30.66	6439.74	40.46	3.73	29.67
15:15:00	395.00	30.64	6592.94	40.46	3.73	34.67
15:20:00	400.00	30.62	6746.04	40.43	3.76	39.67
15:25:00	405.00	30.66	6899.34	40.43	3.76	44.67
15:30:00	410.00	30.64	7052.54	40.43	3.76	49.67
15:35:00	415.00	30.66	7205.84	40.42	3.77	54.67
15:40:00	420.00	30.69	7359.29	40.42	3.77	59.67
15:50:00	430.00	30.62	7665.49	40.42	3.77	69.67
16:00:00	440.00	30.59	7971.39	40.42	3.77	79.67
16:10:00	450.00	30.54	8276.79	40.43	3.76	89.67
16:20:00	460.00	30.49	8581.69	40.42	3.77	99.67
16:30:00	470.00	30.46	8886.29	40.44	3.75	109.67
16:40:00	480.00	30.46	9190.89	40.43	3.76	119.67

Total Volume Injected During Step (GAL):	3670.97
Average Injection Rate (GPM):	30.64
Specific Injectivity (GPM/FT):	8.15

IRZ-21 Upper Screen (48-66 ft) Linear Change in Water Level Plot
Change in Water Level (feet)
Elapsed Time (min)
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
0
100
200
300
400
500
600
700
Legend
Transducer
Manual
Possible user error in collecting manual water level
Step 1:
Total Volume Injected: 838.47 gal
Avg. Injection Rate: 7.74 gpm
Change in Water Level: 0.96 ft
Specific Injectivity: 8.06 gpm/ft
Step 2:
Total Volume Injected: 1976.50 gal
Avg. Injection Rate: 15.15 gpm
Change in Water Level: 1.91 ft
Specific Injectivity: 7.93 gpm/ft
Step 3:
Total Volume Injected: 2704.95 gal
Avg. Injection Rate: 22.37 gpm
Change in Water Level: 2.81 ft
Specific Injectivity: 7.96 gpm/ft
Step 4:
Total Volume Injected: 3670.97 gal
Avg. Injection Rate: 30.64 gpm
Change in Water Level: 3.76 ft
Specific Injectivity: 8.15 gpm/ft
IM3 system shut off before test started and was brought back online during the first step of test
Recovery Data

IRZ-21 Upper Screen (48-66 ft)
Semi-Log Change in Water Level Plot

IRZ-21 Upper Screen (48-66 ft)
Semi-Log Change in Water Level Plot

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID- **IRZ-20**

Well being tested- **IRZ-21 (48-66)**

Task- **Injectivity**

Date	Time	Date and Time	Depth to Water
9/5/2019	10:11	9/5/2019 10:11	43.17
9/5/2019	13:03	9/5/2019 13:03	43.35
9/5/2019	15:29	9/5/2019 15:29	43.21
9/6/2019	9:16	9/6/2019 9:16	43.17
9/6/2019	10:02	9/6/2019 10:02	43.14
9/6/2019	10:15	9/6/2019 10:15	43.18
9/6/2019	11:21	9/6/2019 11:21	43.15
9/6/2019	12:10	9/6/2019 12:10	43.08
9/6/2019	13:24	9/6/2019 13:24	43.13
9/6/2019	14:10	9/6/2019 14:10	43.07
9/6/2019	16:10	9/6/2019 16:10	42.27
9/6/2019	18:20	9/6/2019 18:20	43.26
9/7/2019	8:27	9/7/2019 8:27	42.73
9/7/2019	9:12	9/7/2019 9:12	42.55
9/7/2019	10:07	9/7/2019 10:07	42.90
9/7/2019	11:14	9/7/2019 11:14	42.92
9/7/2019	13:14	9/7/2019 13:14	42.84
9/7/2019	15:18	9/7/2019 15:18	42.77
9/7/2019	17:07	9/7/2019 17:07	43.01

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID- **IRZ-23**

Well being tested- **IRZ-21 (48-66)**

Task- **Injectivity**

Date	Time	Date and Time	Depth to Water
9/5/2019	10:16	9/5/2019 10:16	47.19
9/5/2019	13:06	9/5/2019 13:06	47.37
9/5/2019	15:33	9/5/2019 15:33	47.36
9/6/2019	9:13	9/6/2019 9:13	47.15
9/6/2019	10:04	9/6/2019 10:04	47.10
9/6/2019	10:12	9/6/2019 10:12	47.13
9/6/2019	11:26	9/6/2019 11:26	47.15
9/6/2019	12:06	9/6/2019 12:06	47.13
9/6/2019	13:21	9/6/2019 13:21	47.13
9/6/2019	14:03	9/6/2019 14:03	47.13
9/6/2019	16:08	9/6/2019 16:08	47.13
9/6/2019	18:18	9/6/2019 18:18	47.26
9/7/2019	8:20	9/7/2019 8:20	45.18
9/7/2019	9:14	9/7/2019 9:14	45.07
9/7/2019	10:04	9/7/2019 10:04	46.92
9/7/2019	11:11	9/7/2019 11:11	46.07
9/7/2019	13:12	9/7/2019 13:12	47.11
9/7/2019	15:16	9/7/2019 15:16	47.13
9/7/2019	17:05	9/7/2019 17:05	47.13

IRZ-20 During IRZ-21 Upper Screen (48-66 ft) Injectivity Testing
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-21: 71' 3"
Legend
Transducer
Manual
IM3 system shut off before test started and was brought back online during the first step of test
Recovery Data
Depth to Water (feet)
43.6
43.4
43.2
43
42.8
42.6
42.4
42.2
42
9/7/19 6:00
9/7/19 9:00
9/7/19 12:00
9/7/19 15:00
9/7/19 18:00
Date and Time
Step 1:
Total Volume Injected: 838.47 gal
Avg. Injection Rate: 7.74 gpm
Change in Water Level in IRZ-21: 0.96 ft
Specific Injectivity: 8.06 gpm/ft
Step 2:
Total Volume Injected: 1976.50 gal
Avg. Injection Rate: 15.15 gpm
Change in Water Level in IRZ-21: 1.91 ft
Specific Injectivity: 7.93 gpm/ft
Step 3:
Total Volume Injected: 2704.95 gal
Avg. Injection Rate: 22.37 gpm
Change in Water Level in IRZ-21: 2.81 ft
Specific Injectivity: 7.96 gpm/ft
Step 4:
Total Volume Injected: 3670.97 gal
Avg. Injection Rate: 30.64 gpm
Change in Water Level in IRZ-21: 3.76 ft
Specific Injectivity: 8.15 gpm/ft

IRZ-23 During IRZ-21 Upper Screen (48-66 ft) Injectivity Testing
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-21: 149' 5"
Legend
Transducer
Manual
IM3 system shut off before test started and was brought back online during the first step of test
Recovery Data
Possible user error in collecting manual water level
Depth to Water (feet)
48.5
48
47.5
47
46.5
46
45.5
45
44.5
44
9/7/19 6:00
9/7/19 9:00
9/7/19 12:00
9/7/19 15:00
9/7/19 18:00
Date and Time
Step 1:
Total Volume Injected: 838.47 gal
Avg. Injection Rate: 7.74 gpm
Change in Water Level in IRZ-21: 0.96 ft
Specific Injectivity: 8.06 gpm/ft
Step 2:
Total Volume Injected: 1976.50 gal
Avg. Injection Rate: 15.15 gpm
Change in Water Level in IRZ-21: 1.91 ft
Specific Injectivity: 7.93 gpm/ft
Step 3:
Total Volume Injected: 2704.95 gal
Avg. Injection Rate: 22.37 gpm
Change in Water Level in IRZ-21: 2.81 ft
Specific Injectivity: 7.96 gpm/ft
Step 4:
Total Volume Injected: 3670.97 gal
Avg. Injection Rate: 30.64 gpm
Change in Water Level in IRZ-21: 3.76 ft
Specific Injectivity: 8.15 gpm/ft

MW-20-100 During IRZ-21 Upper Screen (48-66 ft) Injectivity Testing
Step 1
Step 2
Step 3
Step 4
* No manual water levels were collected. Actual water level depths are not reflected
Legend
Transducer
Recovery Data
IM3 system shut off before test started and was brought back online during the first step of test
Level (feet)*
84.5
85
85.5
86
86.5
87
87.5
88
88.5
9/7/19 6:00
9/7/19 9:00
9/7/19 12:00
9/7/19 15:00
9/7/19 18:00
Date and Time
Step 1:
Total Volume Injected: 838.47 gal
Avg. Injection Rate: 7.74 gpm
Change in Water Level in IRZ-21: 0.96 ft
Specific Injectivity: 8.06 gpm/ft
Step 2:
Total Volume Injected: 1976.50 gal
Avg. Injection Rate: 15.15 gpm
Change in Water Level in IRZ-21: 1.91 ft
Specific Injectivity: 7.93 gpm/ft
Step 3:
Total Volume Injected: 2704.95 gal
Avg. Injection Rate: 22.37 gpm
Change in Water Level in IRZ-21: 2.81 ft
Specific Injectivity: 7.96 gpm/ft
Step 4:
Total Volume Injected: 3670.97 gal
Avg. Injection Rate: 30.64 gpm
Change in Water Level in IRZ-21: 3.76 ft
Specific Injectivity: 8.15 gpm/ft

MW-20-070 During IRZ-21 Upper Screen (48-66 ft) Injectivity Testing
Step 1
Step 2
Step 3
Step 4
* No manual water levels were collected. Actual water level depths are not reflected
IM3 system shut off before test started and was brought back online during the first step of test
Legend
Transducer
Recovery Data
Level (feet)*
44.4
44.6
44.8
45
45.2
45.4
45.6
45.8
46
9/7/19 6:00
9/7/19 9:00
9/7/19 12:00
9/7/19 15:00
9/7/19 18:00
Date and Time
Step 1:
Total Volume Injected: 838.47 gal
Avg. Injection Rate: 7.74 gpm
Change in Water Level in IRZ-21: 0.96 ft
Specific Injectivity: 8.06 gpm/ft
Step 2:
Total Volume Injected: 1976.50 gal
Avg. Injection Rate: 15.15 gpm
Change in Water Level in IRZ-21: 1.91 ft
Specific Injectivity: 7.93 gpm/ft
Step 3:
Total Volume Injected: 2704.95 gal
Avg. Injection Rate: 22.37 gpm
Change in Water Level in IRZ-21: 2.81 ft
Specific Injectivity: 7.96 gpm/ft
Step 4:
Total Volume Injected: 3670.97 gal
Avg. Injection Rate: 30.64 gpm
Change in Water Level in IRZ-21: 3.76 ft
Specific Injectivity: 8.15 gpm/ft

MW-20-130 During IRZ-21 Upper Screen (48-66 ft) Injectivity Testing
Step 1
Step 2
Step 3
Step 4
* No manual water levels were collected. Actual water level depths are not reflected
Legend
Transducer
Recovery Data
IM3 system shut off before test started and was brought back online during the first step of test
Level (feet)*
42
42.5
43
43.5
44
44.5
45
45.5
46
46.5
47
9/7/19 6:00
9/7/19 9:00
9/7/19 12:00
9/7/19 15:00
9/7/19 18:00
Date and Time
Step 1:
Total Volume Injected: 838.47 gal
Avg. Injection Rate: 7.74 gpm
Change in Water Level in IRZ-21: 0.96 ft
Specific Injectivity: 8.06 gpm/ft
Step 2:
Total Volume Injected: 1976.50 gal
Avg. Injection Rate: 15.15 gpm
Change in Water Level in IRZ-21: 1.91 ft
Specific Injectivity: 7.93 gpm/ft
Step 3:
Total Volume Injected: 2704.95 gal
Avg. Injection Rate: 22.37 gpm
Change in Water Level in IRZ-21: 2.81 ft
Specific Injectivity: 7.96 gpm/ft
Step 4:
Total Volume Injected: 3670.97 gal
Avg. Injection Rate: 30.64 gpm
Change in Water Level in IRZ-21: 3.76 ft
Specific Injectivity: 8.15 gpm/ft

MW-31-060 During IRZ-21 Upper Screen (48-66 ft) Injectivity Testing
Step 1
Step 2
Step 3
Step 4
* No manual water levels were collected. Actual water level depths are not reflected
Legend
Transducer
IM3 system shut off before test started and was brought back online during the first step of test
Recovery Data
Level (feet)*
43.4
43.6
43.8
44
44.2
44.4
9/7/19 6:00
9/7/19 9:00
9/7/19 12:00
9/7/19 15:00
9/7/19 18:00
Date and Time
Step 1:
Total Volume Injected: 838.47 gal
Avg. Injection Rate: 7.74 gpm
Change in Water Level in IRZ-21: 0.96 ft
Specific Injectivity: 8.06 gpm/ft
Step 2:
Total Volume Injected: 1976.50 gal
Avg. Injection Rate: 15.15 gpm
Change in Water Level in IRZ-21: 1.91 ft
Specific Injectivity: 7.93 gpm/ft
Step 3:
Total Volume Injected: 2704.95 gal
Avg. Injection Rate: 22.37 gpm
Change in Water Level in IRZ-21: 2.81 ft
Specific Injectivity: 7.96 gpm/ft
Step 4:
Total Volume Injected: 3670.97 gal
Avg. Injection Rate: 30.64 gpm
Change in Water Level in IRZ-21: 3.76 ft
Specific Injectivity: 8.15 gpm/ft

MW-31-135 During IRZ-21 Upper Screen (48-66 ft) Injectivity Testing
Step 1
Step 2
Step 3
Step 4
* No manual water levels were collected. Actual water level depths are not reflected
Legend
Transducer
Recovery Data
IM3 system shut off before test started and was brought back online during the first step of test
Level (feet)*
51
51.5
52
52.5
53
53.5
Step 1:
Total Volume Injected: 838.47 gal
Avg. Injection Rate: 7.74 gpm
Change in Water Level in IRZ-21: 0.96 ft
Specific Injectivity: 8.06 gpm/ft
Step 2:
Total Volume Injected: 1976.50 gal
Avg. Injection Rate: 15.15 gpm
Change in Water Level in IRZ-21: 1.91 ft
Specific Injectivity: 7.93 gpm/ft
Step 3:
Total Volume Injected: 2704.95 gal
Avg. Injection Rate: 22.37 gpm
Change in Water Level in IRZ-21: 2.81 ft
Specific Injectivity: 7.96 gpm/ft
Step 4:
Total Volume Injected: 3670.97 gal
Avg. Injection Rate: 30.64 gpm
Change in Water Level in IRZ-21: 3.76 ft
Specific Injectivity: 8.15 gpm/ft
9/7/19 6:00
9/7/19 9:00
9/7/19 12:00
9/7/19 15:00
9/7/19 18:00
Date and Time

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	**IRZ-21**
Date -	**9/7/2019**
Screened Interval Tested -	**Upper Screen (48-66 ft)**
Packer Set Depth -	**75-79 ft bgs**
Packer Seal Test -	Confirmed packer to be watertight before test
Tests Conducted -	4 step Injectivity Test (7.7, 15.2, 22.4, 30.6 GPM)
Purpose -	Well Performance Test
Summary -	Specific Injectivity: 7.93-8.15 GPM/FT
Notes -	IM3 system shut off before test started and was brought back online during the first step of test.
	Possible data drift from transducer or physical transducer placement shift during Step 2.
Oversight Signature -	
Date -	10/8/2019

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	IRZ-21 (Upper)
Date -	9/7/2019
Screened Interval -	48-66
Injection Water Source -	Fresh water from construction water supply system
Injection Outlet Depth -	150 ft bgs
Depth to Packer -	75 ft bgs
Packer Leak Test (Pass/Fail) -	Pass
Water Level Prior to Injection -	44.19
Initial Totalizer Reading -	0
Final Totalizer Reading -	9110.72
Approx. Injection Volume (gal) -	9110.72
Calculated Injection Volume (gal) -	9190.89
Calculated and Totalizer Volume Difference (gal) -	80.17
Number of Injection Steps -	4
Injection Rates (List In Order) -	7.7, 15.2, 22.4, 30.6

Notes: IM3 system shut off before test started and was brought back online during the first step of test.

Step 1					
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)
8:40:00	0.00	0.00	0.00	44.19	0.00
8:40:20	0.33	11.20	3.73	44.50	-0.31
8:40:40	0.67	6.90	6.03	43.65	0.54
8:41:00	1.00	7.86	8.65	43.51	0.68
8:42:00	2.00	7.71	16.36	41.80	2.39
8:43:00	3.00	7.69	24.05	43.35	0.84
8:44:00	4.00	7.68	31.73	43.31	0.88
8:45:00	5.00	7.66	39.39	43.18	1.01
8:46:00	6.00	7.68	47.07	43.26	0.93
8:47:00	7.00	7.66	54.73	43.22	0.97
8:48:00	8.00	7.66	62.39	43.22	0.97
8:49:00	9.00	7.66	70.05	43.18	1.01
8:50:00	10.00	7.64	77.69	43.17	1.02
8:52:00	12.00	7.66	93.01	43.15	1.04
8:54:00	14.00	7.66	108.33	43.11	1.08
8:56:00	16.00	7.68	123.69	43.12	1.07
8:58:00	18.00	7.68	139.05	43.09	1.10
9:00:00	20.00	7.66	154.37	43.08	1.11
9:02:00	22.00	7.66	169.69	43.09	1.10
9:04:00	24.00	7.66	185.01	43.07	1.12
9:06:00	26.00	7.66	200.33	43.07	1.12
9:08:00	28.00	7.66	215.65	43.07	1.12
9:10:00	30.00	7.66	230.97	43.06	1.13
9:15:00	35.00	7.66	269.27	43.03	1.16
9:20:00	40.00	7.66	307.57	43.00	1.19
9:25:00	45.00	7.66	345.87	42.99	1.20
9:30:00	50.00	7.64	384.07	42.99	1.20
9:35:00	55.00	7.66	422.37	42.98	1.21
9:40:00	60.00	7.66	460.67	42.97	1.22
9:50:00	70.00	7.64	537.07	43.02	1.17
10:00:00	80.00	7.54	612.47	43.10	1.09
10:10:00	90.00	7.54	687.87	43.04	1.15
10:20:00	100.00	7.54	763.27	43.18	1.01
10:30:00	110.00	7.52	838.47	43.23	0.96
Total Volume Injected During Step (GAL):		838.47			
Average Injection Rate (GPM):		7.74			
Specific Injectivity (GPM/FT):		8.06			

Step 2						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 2 Start (Min)
10:40:20	120.33	14.46	987.89	42.80	1.39	0.0
10:40:40	120.67	12.16	991.95	42.82	1.37	0.3
10:41:00	121.00	14.48	996.77	42.73	1.46	0.7
10:42:00	122.00	15.36	1012.13	42.49	1.70	1.7
10:43:00	123.00	15.46	1027.59	42.41	1.78	2.7
10:44:00	124.00	15.48	1043.07	42.37	1.82	3.7
10:45:00	125.00	14.72	1057.79	42.36	1.83	4.7
10:46:00	126.00	14.81	1072.60	42.37	1.82	5.7
10:47:00	127.00	15.67	1088.27	42.31	1.88	6.7
10:48:00	128.00	15.36	1103.63	42.30	1.89	7.7
10:49:00	129.00	15.36	1118.99	42.30	1.89	8.7
10:50:00	130.00	15.34	1134.33	42.28	1.91	9.7
10:52:00	132.00	15.34	1165.01	42.27	1.92	11.7
10:54:00	134.00	15.34	1195.69	42.29	1.90	13.7
10:56:00	136.00	15.28	1226.25	42.28	1.91	15.7
10:58:00	138.00	15.30	1256.85	42.27	1.92	17.7
11:00:00	140.00	15.32	1287.49	42.26	1.93	19.7
11:02:00	142.00	15.34	1318.17	42.26	1.93	21.7
11:04:00	144.00	15.28	1348.73	42.26	1.93	23.7
11:06:00	146.00	15.34	1379.41	42.24	1.95	25.7
11:08:00	148.00	15.34	1410.09	42.24	1.95	27.7
11:10:00	150.00	15.34	1440.77	42.25	1.94	29.7
11:15:00	155.00	15.32	1517.37	42.26	1.93	34.7
11:20:00	160.00	15.32	1593.97	42.27	1.92	39.7
11:25:00	165.00	15.27	1670.32	42.26	1.93	44.7
11:30:00	170.00	15.30	1746.82	42.25	1.94	49.7
11:35:00	175.00	15.32	1823.42	42.27	1.92	54.7
11:40:00	180.00	15.27	1899.77	42.27	1.92	59.7
11:50:00	190.00	15.27	2052.47	42.28	1.91	69.7
12:00:00	200.00	15.27	2205.17	42.28	1.91	79.7
12:10:00	210.00	15.24	2357.57	42.28	1.91	89.7
12:20:00	220.00	15.22	2509.77	42.28	1.91	99.7
12:30:00	230.00	15.26	2662.37	42.28	1.91	109.7
12:40:00	240.00	15.26	2814.97	42.28	1.91	119.7

Total Volume Injected During Step (GAL):	1976.50
Average Injection Rate (GPM):	15.15
Specific Injectivity (GPM/FT):	7.93

Step 3						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 3 Start (Min)
12:40:20	240.33	19.24	2821.39	42.11	2.08	0.0
12:40:40	240.67	20.40	2828.19	41.98	2.21	0.3
12:41:00	241.00	23.76	2836.11	41.71	2.48	0.7
12:42:00	242.00	22.32	2858.43	41.67	2.52	1.7
12:43:00	243.00	22.34	2880.77	41.61	2.58	2.7
12:44:00	244.00	21.94	2902.71	41.59	2.60	3.7
12:45:00	245.00	21.88	2924.59	41.58	2.61	4.7
12:46:00	246.00	22.36	2946.95	41.57	2.62	5.7
12:47:00	247.00	23.04	2969.99	41.49	2.70	6.7
12:48:00	248.00	23.04	2993.03	41.47	2.72	7.7
12:49:00	249.00	22.26	3015.29	41.48	2.71	8.7
12:50:00	250.00	22.33	3037.62	41.54	2.65	9.7
12:52:00	252.00	22.32	3082.26	41.49	2.70	11.7
12:54:00	254.00	22.34	3126.94	41.49	2.70	13.7
12:56:00	256.00	22.30	3171.54	41.46	2.73	15.7
12:58:00	258.00	22.61	3216.76	41.46	2.73	17.7
13:00:00	260.00	22.61	3261.98	41.46	2.73	19.7
13:02:00	262.00	22.62	3307.22	41.46	2.73	21.7
13:04:00	264.00	22.64	3352.50	41.45	2.74	23.7
13:06:00	266.00	22.54	3397.58	41.45	2.74	25.7
13:08:00	268.00	22.54	3442.66	41.46	2.73	27.7
13:10:00	270.00	22.56	3487.78	41.46	2.73	29.7
13:15:00	275.00	22.56	3600.58	41.41	2.78	34.7
13:20:00	280.00	22.62	3713.68	41.41	2.78	39.7
13:25:00	285.00	22.34	3825.38	41.43	2.76	44.7
13:30:00	290.00	22.41	3937.43	41.42	2.77	49.7
13:35:00	295.00	22.43	4049.58	41.42	2.77	54.7
13:40:00	300.00	22.41	4161.63	41.41	2.78	59.7
13:50:00	310.00	22.36	4385.23	41.41	2.78	69.7
14:00:00	320.00	22.33	4608.53	41.43	2.76	79.7
14:10:00	330.00	22.71	4835.63	41.4	2.79	89.7
14:20:00	340.00	22.74	5063.03	41.4	2.79	99.7
14:30:00	350.00	22.81	5291.13	41.4	2.79	109.7
14:40:00	360.00	22.88	5519.93	41.38	2.81	119.7
Total Volume Injected During Step (GAL):		2704.95				
Average Injection Rate (GPM):		22.37				
Specific Injectivity (GPM/FT):		7.96				

Step 4						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 4 Start (Min)
14:40:20	360.33	30.70	5530.16	40.94	3.25	0.0
14:40:40	360.67	30.70	5540.39	40.90	3.29	0.3
14:41:00	361.00	30.72	5550.63	40.82	3.37	0.7
14:42:00	362.00	30.70	5581.33	40.70	3.49	1.7
14:43:00	363.00	30.70	5612.03	40.67	3.52	2.7
14:44:00	364.00	30.72	5642.75	40.61	3.58	3.7
14:45:00	365.00	30.70	5673.45	40.58	3.61	4.7
14:46:00	366.00	30.70	5704.15	40.57	3.62	5.7
14:47:00	367.00	30.69	5734.84	40.57	3.62	6.7
14:48:00	368.00	30.69	5765.53	40.54	3.65	7.7
14:49:00	369.00	30.69	5796.22	40.56	3.63	8.7
14:50:00	370.00	30.68	5826.90	40.53	3.66	9.7
14:51:00	371.00	30.66	5857.56	40.52	3.67	10.7
14:54:00	374.00	30.66	5949.54	40.49	3.70	13.7
14:56:00	376.00	30.66	6010.86	40.48	3.71	15.7
14:58:00	378.00	30.64	6072.14	40.49	3.70	17.7
15:00:00	380.00	30.62	6133.38	40.48	3.71	19.7
15:02:00	382.00	30.64	6194.66	40.47	3.72	21.7
15:04:00	384.00	30.62	6255.90	40.47	3.72	23.7
15:06:00	386.00	30.64	6317.18	40.46	3.73	25.7
15:08:00	388.00	30.62	6378.42	40.47	3.72	27.7
15:10:00	390.00	30.66	6439.74	40.46	3.73	29.7
15:15:00	395.00	30.64	6592.94	40.46	3.73	34.7
15:20:00	400.00	30.62	6746.04	40.43	3.76	39.7
15:25:00	405.00	30.66	6899.34	40.43	3.76	44.7
15:30:00	410.00	30.64	7052.54	40.43	3.76	49.7
15:35:00	415.00	30.66	7205.84	40.42	3.77	54.7
15:40:00	420.00	30.69	7359.29	40.42	3.77	59.7
15:50:00	430.00	30.62	7665.49	40.42	3.77	69.7
16:00:00	440.00	30.59	7971.39	40.42	3.77	79.7
16:10:00	450.00	30.54	8276.79	40.43	3.76	89.7
16:20:00	460.00	30.49	8581.69	40.42	3.77	99.7
16:30:00	470.00	30.46	8886.29	40.44	3.75	109.7
16:40:00	480.00	30.46	9190.89	40.43	3.76	119.7
16:41:00	481.00	0.00	9190.89	42.50	1.69	120.7
16:42:00	482.00	0.00	9190.89	42.79	1.40	121.7
16:43:00	483.00	0.00	9190.89	42.99	1.20	122.7
16:44:00	484.00	0.00	9190.89	43.22	0.97	123.7
16:45:00	485.00	0.00	9190.89	43.33	0.86	124.7

Total Volume Injected During Step (GAL):	3670.97
Average Injection Rate (GPM):	30.64
Specific Injectivity (GPM/FT):	8.15

IRZ-21 Upper Screen (48-66 ft) Linear Change in Water Level Plot
Change in Water Level (feet)
Elapsed Time (min)
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
0
100
200
300
400
500
600
700
Legend
Transducer
Manual
Step 3:
Step 3 Total Volume Injected: 2704.95 gal
Avg. Injection Rate: 22.37 gpm
Change in Water Level: 2.81 ft
Specific Injectivity: 7.96 gpm/ft
Step 4:
Step 4 Total Volume Injected: 3670.97 gal
Avg. Injection Rate: 30.64 gpm
Change in Water Level: 3.76 ft
Specific Injectivity: 8.15 gpm/ft
Possible data drift from transducer or physical transducer placement shift
Recovery Data
Step 2:
Step 2 Total Volume Injected: 1976.50 gal
Avg. Injection Rate: 15.15 gpm
Change in Water Level: 1.91 ft
Specific Injectivity: 7.93 gpm/ft
IM3 system was brought back online
Step 1:
Step 1 Total Volume Injected: 838.47 gal
Avg. Injection Rate: 7.74 gpm
Change in Water Level: 0.96 ft
Specific Injectivity: 8.06 gpm/ft

IRZ-21 Upper Screen (48-66 ft)
Semi-Log Change in Water Level Plot

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	**IRZ-20**
Date -	**9/10/2019**
Screened Interval Tested -	**Upper Screen (49-71 ft)**
Packer Set Depth -	**86.5-90.5 ft bgs**
Packer Seal Test -	Confirmed packer to be watertight before test
Tests Conducted -	4 step Injectivity Test (7.5, 15.3, 22.5, 32.3 GPM)
Purpose -	Well Performance Test
Summary -	Specific Injectivity: 9.79-10.46 GPM/FT
Notes -	Possible drift in transducer data during Step 2.
	Transducer data in monitoring point IRZ-21 is unreliable due to a possible transducer malfunction. Manual readings are accurate.
Oversight Signature -	
Date -	1/2/2020

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	IRZ-20 (Upper)
Date -	9/10/2019
Screened Interval -	49-71
Injection Water Source -	Fresh water from construction water supply system
Injection Outlet Depth (ft btoc) -	60 ft bgs
Packer Depth (ft btoc) -	86.5 ft bgs
Packer Leak Test (Pass/Fail) -	Pass
Initial Water Level Within Screen Interval 49' - 71' -	43.05
Initial Water Level Within Screen Interval 136' - 155' -	43.85
Initial Totalizer Reading -	0
Final Totalizer Reading -	9273.72
Approx. Injection Volume (gal) -	9273.72
Calculated Injection Volume (gal) -	9300.33
Calculated and Totalizer Volume Difference (gal) -	26.61
Number of Injection Steps -	4
Injection Rates (List In Order) -	7.5, 15.3, 22.5, and 32.3

Step 1					
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)
9:15:00	0.00	0.00	0.00	43.05	0.00
9:15:20	0.33	8.33	2.78	42.88	0.17
9:15:40	0.67	7.67	5.33	42.60	0.45
9:16:00	1.00	7.52	7.84	42.58	0.47
9:17:00	2.00	7.52	15.36	42.51	0.54
9:18:00	3.00	7.52	22.88	42.50	0.55
9:19:00	4.00	7.52	30.40	42.48	0.57
9:20:00	5.00	7.52	37.92	42.45	0.60
9:21:00	6.00	7.49	45.41	42.45	0.60
9:22:00	7.00	7.50	52.91	42.45	0.60
9:23:00	8.00	7.50	60.41	42.44	0.61
9:24:00	9.00	7.52	67.93	42.43	0.62
9:25:00	10.00	7.52	75.45	42.43	0.62
9:26:00	11.00	7.50	82.95	42.41	0.64
9:29:00	14.00	7.52	105.51	42.42	0.63
9:31:00	16.00	7.50	120.51	42.40	0.65
9:33:00	18.00	7.52	135.55	42.40	0.65
9:35:00	20.00	7.50	150.55	42.40	0.65
9:37:00	22.00	7.50	165.55	42.40	0.65
9:39:00	24.00	7.54	180.63	42.40	0.65
9:41:00	26.00	7.56	195.75	42.38	0.67
9:43:00	28.00	7.56	210.87	42.38	0.67
9:45:00	30.00	7.50	225.87	42.38	0.67
9:50:00	35.00	7.50	263.37	42.38	0.67
9:55:00	40.00	7.50	300.87	42.38	0.67
10:00:00	45.00	7.50	338.37	42.38	0.67
10:05:00	50.00	7.49	375.82	42.38	0.67
10:10:00	55.00	7.50	413.32	42.38	0.67
10:15:00	60.00	7.49	450.77	42.35	0.70
10:25:00	70.00	7.48	525.57	42.35	0.70
10:35:00	80.00	7.46	600.17	42.35	0.70
10:45:00	90.00	7.49	675.07	42.34	0.71
10:55:00	100.00	7.46	749.67	42.34	0.71
11:05:00	110.00	7.46	824.27	42.33	0.72
11:15:00	120.00	7.40	898.27	42.33	0.72

Total Volume Injected During Step (GAL):	898.27
Average Injection Rate (GPM):	7.53
Specific Injectivity (GPM/FT):	10.46

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	IRZ-20 (Upper)
Date -	9/10/2019
Screened Interval -	49-71
Injection Water Source -	Fresh water from construction water supply system
Injection Outlet Depth (ft btoc) -	60 ft bgs
Packer Depth (ft btoc) -	86.5 ft bgs
Packer Leak Test (Pass/Fail) -	Pass
Initial Water Level Within Screen Interval 49' - 71' -	43.05
Initial Water Level Within Screen Interval 136' - 155' -	43.85
Initial Totalizer Reading -	0
Final Totalizer Reading -	9273.72
Approx. Injection Volume (gal) -	9273.72
Calculated Injection Volume (gal) -	9300.33
Calculated and Totalizer Volume Difference (gal) -	26.61
Number of Injection Steps -	4
Injection Rates (List In Order) -	7.5, 15.3, 22.5, and 32.3

Step 2						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 2 Start (Min)
11:15:20	120.33	14.69	903.17	41.94	1.11	0.00
11:15:40	120.67	14.23	907.91	41.92	1.13	0.33
11:16:00	121.00	14.23	912.65	41.88	1.17	0.67
11:17:00	122.00	15.37	928.02	41.78	1.27	1.67
11:18:00	123.00	15.34	943.36	41.71	1.34	2.67
11:19:00	124.00	15.37	958.73	41.69	1.36	3.67
11:20:00	125.00	15.37	974.10	41.66	1.39	4.67
11:21:00	126.00	15.36	989.46	41.65	1.40	5.67
11:22:00	127.00	15.34	1004.80	41.64	1.41	6.67
11:23:00	128.00	--	1004.80	--	--	7.67
11:24:00	129.00	15.34	1020.14	41.63	1.42	8.67
11:25:00	130.00	15.36	1035.50	41.63	1.42	9.67
11:27:00	132.00	15.36	1066.22	41.61	1.44	11.67
11:29:00	134.00	15.34	1096.90	41.60	1.45	13.67
11:31:00	136.00	15.32	1127.54	41.59	1.46	15.67
11:33:00	138.00	15.36	1158.26	41.59	1.46	17.67
11:35:00	140.00	15.34	1188.94	41.58	1.47	19.67
11:37:00	142.00	15.38	1219.70	41.58	1.47	21.67
11:39:00	144.00	15.37	1250.44	41.58	1.47	23.67
11:41:00	146.00	15.38	1281.20	41.58	1.47	25.67
11:43:00	148.00	15.38	1311.96	41.57	1.48	27.67
11:45:00	150.00	15.38	1342.72	41.57	1.48	29.67
11:50:00	155.00	15.36	1419.52	41.57	1.48	34.67
11:55:00	160.00	15.37	1496.37	41.57	1.48	39.67
12:00:00	165.00	15.32	1572.97	41.55	1.50	44.67
12:05:00	170.00	15.36	1649.77	41.55	1.50	49.67
12:10:00	175.00	15.32	1726.37	41.55	1.50	54.67
12:15:00	180.00	15.32	1802.97	41.54	1.51	59.67
12:25:00	190.00	15.32	1956.17	41.53	1.52	69.67
12:35:00	200.00	15.22	2108.37	41.54	1.51	79.67
12:45:00	210.00	15.22	2260.57	41.53	1.52	89.67
12:55:00	220.00	15.19	2412.47	41.53	1.52	99.67
13:05:00	230.00	15.24	2564.87	41.53	1.52	109.67
13:15:00	240.00	15.24	2717.27	41.53	1.52	119.67

Total Volume Injected During Step (GAL):	1819.00
Average Injection Rate (GPM):	15.25
Specific Injectivity (GPM/FT):	10.03

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	IRZ-20 (Upper)
Date -	9/10/2019
Screened Interval -	49-71
Injection Water Source -	Fresh water from construction water supply system
Injection Outlet Depth (ft btoc) -	60 ft bgs
Packer Depth (ft btoc) -	86.5 ft bgs
Packer Leak Test (Pass/Fail) -	Pass
Initial Water Level Within Screen Interval 49' - 71' -	43.05
Initial Water Level Within Screen Interval 136' - 155' -	43.85
Initial Totalizer Reading -	0
Final Totalizer Reading -	9273.72
Approx. Injection Volume (gal) -	9273.72
Calculated Injection Volume (gal) -	9300.33
Calculated and Totalizer Volume Difference (gal) -	26.61
Number of Injection Steps -	4
Injection Rates (List In Order) -	7.5, 15.3, 22.5, and 32.3

Step 3						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 3 Start (Min)
13:15:20	240.33	21.12	2724.31	41.53	1.52	0.00
13:15:40	240.67	21.84	2731.59	41.35	1.70	0.33
13:16:00	241.00	22.03	2738.94	41.20	1.85	0.67
13:17:00	242.00	22.26	2761.20	41.15	1.90	1.67
13:18:00	243.00	22.28	2783.48	41.06	1.99	2.67
13:19:00	244.00	22.28	2805.76	41.00	2.05	3.67
13:20:00	245.00	22.36	2828.12	41.00	2.05	4.67
13:21:00	246.00	22.34	2850.46	40.97	2.08	5.67
13:22:00	247.00	22.34	2872.80	40.97	2.08	6.67
13:23:00	248.00	22.34	2895.14	40.95	2.10	7.67
13:24:00	249.00	22.36	2917.50	40.93	2.12	8.67
13:25:00	250.00	22.36	2939.86	40.93	2.12	9.67
13:26:00	251.00	22.36	2962.22	40.94	2.11	10.67
13:27:00	252.00	22.36	2984.58	40.91	2.14	11.67
13:28:00	253.00	22.36	3006.94	40.91	2.14	12.67
13:33:00	258.00	22.41	3118.99	40.90	2.15	17.67
13:35:00	260.00	22.40	3163.79	40.90	2.15	19.67
13:37:00	262.00	22.41	3208.61	40.89	2.16	21.67
13:39:00	264.00	22.43	3253.47	40.89	2.16	23.67
13:41:00	266.00	22.43	3298.33	40.89	2.16	25.67
13:43:00	268.00	22.44	3343.21	40.89	2.16	27.67
13:45:00	270.00	22.44	3388.09	40.89	2.16	29.67
13:50:00	275.00	22.48	3500.49	40.86	2.19	34.67
13:55:00	280.00	22.50	3612.99	40.85	2.20	39.67
14:00:00	285.00	22.51	3725.54	40.85	2.20	44.67
14:05:00	290.00	22.61	3838.59	40.83	2.22	49.67
14:10:00	295.00	22.60	3951.59	40.83	2.22	54.67
14:15:00	300.00	22.58	4064.49	40.83	2.22	59.67
14:25:00	310.00	22.53	4289.79	40.83	2.22	69.67
14:35:00	320.00	22.50	4514.79	40.84	2.21	79.67
14:45:00	330.00	22.46	4739.39	40.83	2.22	89.67
14:55:00	340.00	22.43	4963.69	40.83	2.22	99.67
15:05:00	350.00	22.41	5187.79	40.83	2.22	109.67
15:15:00	360.00	24.28	5430.59	40.79	2.26	119.67
15:15:20	360.33	24.28	5438.68	40.75	2.30	120.00
15:15:40	360.67	24.28	5446.77	40.75	2.30	120.33

Total Volume Injected During Step (GAL):	2729.50
Average Injection Rate (GPM):	22.51
Specific Injectivity (GPM/FT):	9.79

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	**IRZ-20 (Upper)**
Date -	**9/10/2019**
Screened Interval -	**49-71**
Injection Water Source -	**Fresh water from construction water supply system**
Injection Outlet Depth (ft btoc) -	**60 ft bgs**
Packer Depth (ft btoc) -	**86.5 ft bgs**
Packer Leak Test (Pass/Fail) -	**Pass**
Initial Water Level Within Screen Interval 49' - 71' -	**43.05**
Initial Water Level Within Screen Interval 136' - 155' -	**43.85**
Initial Totalizer Reading -	**0**
Final Totalizer Reading -	**9273.72**
Approx. Injection Volume (gal) -	**9273.72**
Calculated Injection Volume (gal) -	**9300.33**
Calculated and Totalizer Volume Difference (gal) -	**26.61**
Number of Injection Steps -	**4**
Injection Rates (List In Order) -	**7.5, 15.3, 22.5, and 32.3**

Step 4						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 4 Start (Min)
15:16:00	361.00	32.32	5457.55	40.50	2.55	0.33
15:17:00	362.00	32.32	5489.87	40.30	2.75	1.33
15:18:00	363.00	32.32	5522.19	40.17	2.88	2.33
15:19:00	364.00	32.32	5554.51	40.14	2.91	3.33
15:20:00	365.00	32.32	5586.83	40.10	2.95	4.33
15:21:00	366.00	32.32	5619.15	40.08	2.97	5.33
15:22:00	367.00	32.32	5651.47	40.06	2.99	6.33
15:23:00	368.00	32.34	5683.81	40.05	3.00	7.33
15:24:00	369.00	32.32	5716.13	40.05	3.00	8.33
15:25:00	370.00	32.32	5748.45	40.04	3.01	9.33
15:27:00	372.00	32.34	5813.13	40.03	3.02	11.33
15:29:00	374.00	32.36	5877.85	40.02	3.03	13.33
15:31:00	376.00	32.36	5942.57	40.00	3.05	15.33
15:33:00	378.00	32.38	6007.33	40.00	3.05	17.33
15:35:00	380.00	32.36	6072.05	40.00	3.05	19.33
15:37:00	382.00	32.39	6136.83	39.97	3.08	21.33
15:39:00	384.00	32.39	6201.61	39.97	3.08	23.33
15:41:00	386.00	32.40	6266.41	39.97	3.08	25.33
15:43:00	388.00	32.42	6331.25	39.97	3.08	27.33
15:45:00	390.00	32.44	6396.13	39.95	3.10	29.33
15:50:00	395.00	32.44	6558.33	39.95	3.10	34.33
15:55:00	400.00	32.42	6720.43	39.95	3.10	39.33
16:00:00	405.00	32.42	6882.53	39.94	3.11	44.33
16:05:00	410.00	32.42	7044.63	39.94	3.11	49.33
16:10:00	415.00	32.38	7206.53	39.94	3.11	54.33
16:15:00	420.00	32.36	7368.33	39.94	3.11	59.33
16:25:00	430.00	32.32	7691.53	39.94	3.11	69.33
16:35:00	440.00	32.26	8014.13	39.94	3.11	79.33
16:45:00	450.00	32.22	8336.33	39.95	3.10	89.33
16:55:00	460.00	32.16	8657.93	39.94	3.11	99.33
17:05:00	470.00	32.12	8979.13	39.95	3.10	109.33
17:15:00	480.00	32.12	9300.33	40.84	2.21	119.33

Total Volume Injected During Step (GAL):	3853.55
Average Injection Rate (GPM):	32.33
Specific Injectivity (GPM/FT):	10.43

IRZ-20 Upper Screen (49-71 ft) Linear Change in Water Level Plot
Change in Water Level (feet)
Elapsed Time (min)
0
0.5
1
1.5
2
2.5
3
3.5
0
100
200
300
400
500
600
700
Legend
Transducer
Manual
Step 1:
Total Volume Injected: 898.27 gal
Avg. Injection Rate: 7.53 gpm
Change in Water Level: 0.72 ft
Specific Injectivity: 10.46 gpm/ft
Step 2:
Total Volume Injected: 1819.00 gal
Avg. Injection Rate: 15.25 gpm
Change in Water Level: 1.52 ft
Specific Injectivity: 10.03 gpm/ft
Step 3:
Total Volume Injected: 2729.50 gal
Avg. Injection Rate: 22.51 gpm
Change in Water Level: 2.3 ft
Specific Injectivity: 9.79 gpm/ft
Step 4:
Total Volume Injected: 3853.55 gal
Avg. Injection Rate: 32.33 gpm
Change in Water Level: 3.10 ft
Specific Injectivity: 10.43 gpm/ft
Possible drift in transducer data
Recovery Data

IRZ-20 Upper Screen (49-71 ft)

IRZ-20 Upper Screen (49-71 ft)
Semi-Log Change in Water Level Plot

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID- **IRZ-21**

Well being tested- **IRZ-20 (Upper)**

Task- **Injectivity**

Date	Time	Date+Time	Depth to Water
9/9/2019	7:49	9/9/2019 7:49	44.60
9/9/2019	8:51	9/9/2019 8:51	44.54
9/9/2019	9:47	9/9/2019 9:47	44.52
9/9/2019	11:01	9/9/2019 11:01	44.52
9/9/2019	12:03	9/9/2019 12:03	44.53
9/9/2019	13:42	9/9/2019 13:42	44.49
9/9/2019	15:44	9/9/2019 15:44	44.37
9/9/2019	17:16	9/9/2019 17:16	44.51
9/10/2019	7:40	9/10/2019 7:40	44.56
9/10/2019	8:57	9/10/2019 8:57	44.42
9/10/2019	10:13	9/10/2019 10:13	44.38
9/10/2019	11:57	9/10/2019 11:57	44.27
9/10/2019	13:46	9/10/2019 13:46	44.14
9/10/2019	15:47	9/10/2019 15:47	44.03
9/10/2019	17:34	9/10/2019 17:34	44.23

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID- **MW-31-60**

Well being tested- **IRZ-20**

Task- **Injectivity**

Date	Time	Date+Time	Depth to Water
9/9/2019	7:47	9/9/2019 7:47	41.57
9/9/2019	8:56	9/9/2019 8:56	41.55
9/9/2019	9:44	9/9/2019 9:44	41.55
9/9/2019	11:06	9/9/2019 11:06	41.55
9/9/2019	12:01	9/9/2019 12:01	41.54
9/9/2019	13:47	9/9/2019 13:47	41.54
9/9/2019	15:50	9/9/2019 15:50	41.56
9/9/2019	17:22	9/9/2019 17:22	41.64
9/10/2019	7:49	9/10/2019 7:49	41.52
9/10/2019	9:01	9/10/2019 9:01	41.41
9/10/2019	10:10	9/10/2019 10:10	41.33
9/10/2019	11:52	9/10/2019 11:52	41.30
9/10/2019	13:42	9/10/2019 13:42	41.30
9/10/2019	15:47	9/10/2019 15:47	41.18
9/10/2019	17:40	9/10/2019 17:40	41.32

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID- **MW-31-135**

Well being tested- **IRZ-20**

Task- **Injectivity**

Date	Time	Date+Time	Depth to Water
9/9/2019	7:50	9/9/2019 7:50	43.72
9/9/2019	8:54	9/9/2019 8:54	43.68
9/9/2019	9:43	9/9/2019 9:43	43.65
9/9/2019	11:03	9/9/2019 11:03	43.69
9/9/2019	11:58	9/9/2019 11:58	43.62
9/9/2019	13:44	9/9/2019 13:44	43.62
9/9/2019	15:48	9/9/2019 15:48	43.62
9/9/2019	17:19	9/9/2019 17:19	43.67
9/10/2019	7:46	9/10/2019 7:46	43.53
9/10/2019	9:05	9/10/2019 9:05	43.49
9/10/2019	10:08	9/10/2019 10:08	43.50
9/10/2019	11:54	9/10/2019 11:54	43.50
9/10/2019	15:48	9/10/2019 15:48	43.60
9/10/2019	17:37	9/10/2019 17:37	43.78

IRZ-21 Water Level During IRZ-20 Upper Screen (49-71 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-20: 71' 3"
Legend
Transducer
Manual
Initial Injectivity Evaluation
Possible Transducer Malfunction
Recovery Data
Depth to Water (feet)
41
41.5
42
42.5
43
43.5
44
44.5
45
45.5
46
9/10/19 6:00
9/10/19 9:00
9/10/19 12:00
9/10/19 15:00
9/10/19 18:00
Elapsed Time (min)
Step 1:
Total Volume Injected: 898.27 gal
Avg. Injection Rate: 7.53 gpm
Change in Water Level in IRZ-20: 0.72 ft
Specific Injectivity: 10.46 gpm/ft
Step 2:
Total Volume Injected: 1819.00 gal
Avg. Injection Rate: 15.25 gpm
Change in Water Level in IRZ-20: 1.52 ft
Specific Injectivity: 10.03 gpm/ft
Step 3:
Total Volume Injected: 2729.50 gal
Avg. Injection Rate: 22.51 gpm
Change in Water Level in IRZ-20: 2.3 ft
Specific Injectivity: 9.79 gpm/ft
Step 4:
Total Volume Injected: 3853.55 gal
Avg. Injection Rate: 32.33 gpm
Change in Water Level in IRZ-20: 3.10 ft
Specific Injectivity: 10.43 gpm/ft

MW-31-060 Water Level During IRZ-20 Upper Screen (49-71 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Transducer shift due to vertical movement of transducer during manual water level readings
Distance to IRZ-20: 111' 8"
Legend
Transducer
Manual
Recovery Data
Initial Injectivity Evaluation
Transducer shift due to vertical movement of transducer during manual water level readings
Step 1:
Total Volume Injected: 898.27 gal
Avg. Injection Rate: 7.53 gpm
Change in Water Level in IRZ-20: 0.72 ft
Specific Injectivity: 10.46 gpm/ft
Step 2:
Total Volume Injected: 1819.00 gal
Avg. Injection Rate: 15.25 gpm
Change in Water Level in IRZ-20: 1.52 ft
Specific Injectivity: 10.03 gpm/ft
Step 3:
Total Volume Injected: 2729.50 gal
Avg. Injection Rate: 22.51 gpm
Change in Water Level in IRZ-20: 2.3 ft
Specific Injectivity: 9.79 gpm/ft
Step 4:
Total Volume Injected: 3853.55 gal
Avg. Injection Rate: 32.33 gpm
Change in Water Level in IRZ-20: 3.10 ft
Specific Injectivity: 10.43 gpm/ft
Depth to Water (feet)
40.7
40.9
41.1
41.3
41.5
41.7
41.9
42.1
9/10/19 6:00
9/10/19 9:00
9/10/19 12:00
9/10/19 15:00
9/10/19 18:00
Elapsed Time (min)

MW-31-135 Water Level During IRZ-20 Upper Screen (49-71 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-20: 72' 3"
Legend
Transducer
Manual
Initial Injectivity Evaluation
Recovery Data
Depth to Water (feet)
42.5
43
43.5
44
44.5
45
9/10/19 6:00
9/10/19 9:00
9/10/19 12:00
9/10/19 15:00
9/10/19 18:00
Elapsed Time (min)
Step 1:
Total Volume Injected: 898.27 gal
Avg. Injection Rate: 7.53 gpm
Change in Water Level in IRZ-20: 0.72 ft
Specific Injectivity: 10.46 gpm/ft
Step 2:
Total Volume Injected: 1819.00 gal
Avg. Injection Rate: 15.25 gpm
Change in Water Level in IRZ-20: 1.52 ft
Specific Injectivity: 10.03 gpm/ft
Step 3:
Total Volume Injected: 2729.50 gal
Avg. Injection Rate: 22.51 gpm
Change in Water Level in IRZ-20: 2.3 ft
Specific Injectivity: 9.79 gpm/ft
Step 4:
Total Volume Injected: 3853.55 gal
Avg. Injection Rate: 32.33 gpm
Change in Water Level in IRZ-20: 3.10 ft
Specific Injectivity: 10.43 gpm/ft

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	**IRZ-21**
Date -	**9/6/2019**
Screened Interval Tested -	**Lower Screen (141-158 ft)**
Packer Set Depth -	**75-79 ft bgs**
Packer Seal Test -	Confirmed packer to be watertight before test
Tests Conducted -	4 step Injectivity Test (5, 10, 15, 25 GPM Respectfully)
Purpose -	Well Performance Test
Summary -	Specific Injectivity: 0.52-0.67 GPM/FT
Notes -	Water level meter malfunctioned during the beginning of each step up and depth to water readings were inadvertently missed.
	Fresh water poly tank ran low on water during step 4 of test and the injection pump stopped between 1635 and 1638. Once injection continued, step 4 was extended an extra 30 minutes outside of normal stabilization time of 2 hours.
	Flow rate was increased at end of step 4 during test to troubleshoot a technical issue within drop pipe.
Oversight Signature -	
Date -	1/3/2020

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	IRZ-21 (Lower)
Date -	9/6/2019
Screened Interval -	141'-158' bgs
Injection Water Source -	Fresh water from construction water supply system
Injection Outlet Depth -	150' btoc
Depth to Packer -	75' btoc
Packer Leak Test (Pass/Fail) -	Pass
Water Level Prior to Injection (ft btoc) -	47.68
Initial Totalizer Reading -	0
Final Totalizer Reading -	7544.13
Approx. Injection Volume (gal) -	7544.13
Calculated Injection Volume (gal) -	7583.04
Calculated and Totalizer Volume	38.91
Number of Injection Steps -	4
Injection Rates (List In Order) -	5, 10, 15, 25 GPM Respectfully

Step 1					
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)
9:30:00	0.00	0.00	0.00	47.68	0.00
9:30:20	0.33	5.26	1.75	44.09	3.59
9:30:40	0.67	5.18	3.48	42.54	5.14
9:31:00	1.00	5.22	5.22	41.51	6.17
9:32:00	2.00	5.36	10.58	39.58	8.10
9:33:00	3.00	5.38	15.96	39.02	8.66
9:34:00	4.00	5.36	21.32	38.98	8.70
9:35:00	5.00	5.38	26.70	39.13	8.55
9:36:00	6.00	5.36	32.06	39.16	8.52
9:37:00	7.00	5.33	37.39	39.03	8.65
9:38:00	8.00	5.33	42.72	38.90	8.78
9:39:00	9.00	5.35	48.07	39.34	8.34
9:40:00	10.00	5.35	53.42	39.43	8.25
9:42:00	12.00	5.33	64.08	39.25	8.43
9:44:00	14.00	5.33	74.74	39.29	8.39
9:46:00	16.00	5.33	85.40	39.36	8.32
9:48:00	18.00	5.30	96.00	39.49	8.19
9:50:00	20.00	5.30	106.60	39.39	8.29
9:52:00	22.00	5.28	117.16	39.32	8.36
9:54:00	24.00	5.10	127.36	39.30	8.38
9:56:00	26.00	5.02	137.40	39.83	7.85
9:58:00	28.00	4.81	147.02	39.99	7.69
10:00:00	30.00	5.33	157.68	39.40	8.28
10:05:00	35.00	5.38	184.58	39.30	8.38
10:10:00	40.00	5.40	211.58	39.20	8.48
10:15:00	45.00	5.43	238.73	39.00	8.68
10:20:00	50.00	5.44	265.93	39.02	8.66
10:25:00	55.00	5.44	293.13	38.83	8.85
10:30:00	60.00	5.43	320.28	39.02	8.66
10:40:00	70.00	5.48	375.08	39.07	8.61
10:50:00	80.00	5.46	429.68	39.09	8.59
11:00:00	90.00	5.46	484.28	39.00	8.68
11:10:00	100.00	5.44	538.68	39.07	8.61
11:20:00	110.00	5.44	593.08	39.72	7.96

Total Volume Injected During Step (GAL):	593.08
Average Injection Rate (GPM):	5.33
Specific Injectivity (GPM/FT):	0.67

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	IRZ-21 (Lower)
Date -	9/6/2019
Screened Interval -	141'-158' bgs
Injection Water Source -	Fresh water from construction water supply system
Injection Outlet Depth -	150' btoc
Depth to Packer -	75' btoc
Packer Leak Test (Pass/Fail) -	Pass
Water Level Prior to Injection (ft btoc) -	47.68
Initial Totalizer Reading -	0
Final Totalizer Reading -	7544.13
Approx. Injection Volume (gal) -	7544.13
Calculated Injection Volume (gal) -	7583.04
Calculated and Totalizer Volume	38.91
Number of Injection Steps -	4
Injection Rates (List In Order) -	5, 10, 15, 25 GPM Respectfully

Step 2						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 2 Start (Min)
11:30:00	120.00	5.44	593.08			0.0
11:30:20	120.33	6.80	595.35			0.3
11:31:00	121.00	10.12	602.09	31.52	16.16	1.0
11:32:00	122.00	10.12	612.21	31.50	16.18	2.0
11:33:00	123.00	10.12	622.33	31.58	16.10	3.0
11:34:00	124.00	10.14	632.47	31.57	16.11	4.0
11:35:00	125.00	10.12	642.59	31.53	16.15	5.0
11:36:00	126.00	10.14	652.73	31.52	16.16	6.0
11:37:00	127.00	10.12	662.85	31.52	16.16	7.0
11:38:00	128.00	10.14	672.99	31.53	16.15	8.0
11:39:00	129.00	10.12	683.11	31.54	16.14	9.0
11:40:00	130.00	10.12	693.23	31.55	16.13	10.0
11:42:00	132.00	10.12	713.47	31.56	16.12	12.0
11:44:00	134.00	10.12	733.71	31.55	16.13	14.0
11:46:00	136.00	10.14	753.99	31.53	16.15	16.0
11:48:00	138.00	10.09	774.17	31.55	16.13	18.0
11:50:00	140.00	10.09	794.35	31.58	16.10	20.0
11:52:00	142.00	10.09	814.53	31.57	16.11	22.0
11:54:00	144.00	10.08	834.69	31.59	16.09	24.0
11:56:00	146.00	10.10	854.89	31.61	16.07	26.0
11:58:00	148.00	10.08	875.05	31.62	16.06	28.0
12:00:00	150.00	10.08	895.21	31.62	16.06	30.0
12:05:00	155.00	10.08	945.61	31.63	16.05	35.0
12:10:00	160.00	10.08	996.01	31.62	16.06	40.0
12:15:00	165.00	10.09	1046.46	31.61	16.07	45.0
12:20:00	170.00	10.08	1096.86	31.63	16.05	50.0
12:25:00	175.00	10.06	1147.16	31.65	16.03	55.0
12:30:00	180.00	10.08	1197.56	31.66	16.02	60.0
12:40:00	190.00	10.06	1298.16	31.66	16.02	70.0
12:50:00	200.00	10.20	1400.16	31.68	16.00	80.0
13:00:00	210.00	10.20	1502.16	31.58	16.10	90.0
13:10:00	220.00	10.18	1603.96	31.45	16.23	100.0
13:20:00	230.00	10.20	1705.96	31.49	16.19	110.0
13:30:00	240.00	10.20	1807.96	31.44	16.24	120.0

Total Volume Injected During Step (GAL):	1214.88
Average Injection Rate (GPM):	9.88
Specific Injectivity (GPM/FT):	0.61

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	IRZ-21 (Lower)
Date -	9/6/2019
Screened Interval -	141'-158' bgs
Injection Water Source -	Fresh water from construction water supply system
Injection Outlet Depth -	150' btoc
Depth to Packer -	75' btoc
Packer Leak Test (Pass/Fail) -	Pass
Water Level Prior to Injection (ft btoc) -	47.68
Initial Totalizer Reading -	0
Final Totalizer Reading -	7544.13
Approx. Injection Volume (gal) -	7544.13
Calculated Injection Volume (gal) -	7583.04
Calculated and Totalizer Volume	38.91
Number of Injection Steps -	4
Injection Rates (List In Order) -	5, 10, 15, 25 GPM Respectfully

Step 3						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 3 Start (Min)
13:30:20	240.33	17.80	1813.90	31.44	16.24	0.0
13:30:40	240.67	15.75	1819.15			0.3
13:31:00	241.00	14.98	1824.14	23.68	24.00	0.7
13:32:00	242.00	14.99	1839.13	23.61	24.07	1.7
13:33:00	243.00	15.04	1854.17	23.56	24.12	2.7
13:34:00	244.00	15.02	1869.19	23.53	24.15	3.7
13:35:00	245.00	15.02	1884.21	23.5	24.18	4.7
13:36:00	246.00	15.07	1899.28	23.49	24.19	5.7
13:37:00	247.00	15.09	1914.37	23.42	24.26	6.7
13:38:00	248.00	15.09	1929.46	23.42	24.26	7.7
13:39:00	249.00	15.10	1944.56	23.41	24.27	8.7
13:40:00	250.00	15.09	1959.65	23.39	24.29	9.7
13:42:00	252.00	15.10	1989.85	23.38	24.30	11.7
13:44:00	254.00	15.12	2020.09	23.37	24.31	13.7
13:46:00	256.00	15.10	2050.29	23.35	24.33	15.7
13:48:00	258.00	15.12	2080.53	23.34	24.34	17.7
13:50:00	260.00	15.10	2110.73	23.35	24.33	19.7
13:52:00	262.00	15.12	2140.97	23.35	24.33	21.7
13:54:00	264.00	15.10	2171.17	23.35	24.33	23.7
13:56:00	266.00	15.10	2201.37	23.35	24.33	25.7
13:58:00	268.00	15.10	2231.57	23.35	24.33	27.7
14:00:00	270.00	15.09	2261.75	23.35	24.33	29.7
14:05:00	275.00	15.09	2337.20	23.32	24.36	34.7
14:10:00	280.00	15.07	2412.55	23.33	24.35	39.7
14:15:00	285.00	15.09	2488.00	23.33	24.35	44.7
14:20:00	290.00	15.07	2563.35	23.33	24.35	49.7
14:25:00	295.00	15.06	2638.65	23.31	24.37	54.7
14:30:00	300.00	15.06	2713.95	23.32	24.36	59.7
14:40:00	310.00	15.06	2864.55	23.29	24.39	69.7
14:50:00	320.00	15.02	3014.75	23.29	24.39	79.7
15:00:00	330.00	15.02	3164.95	23.31	24.37	89.7
15:10:00	340.00	15.00	3314.95	23.31	24.37	99.7
15:20:00	350.00	15.00	3464.95	23.32	24.36	109.7
15:30:00	360.00	14.96	3614.55	19.47	28.21	119.7

Total Volume Injected During Step (GAL):	1806.59
Average Injection Rate (GPM):	15.16
Specific Injectivity (GPM/FT):	0.54

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	IRZ-21 (Lower)
Date -	9/6/2019
Screened Interval -	141'-158' bgs
Injection Water Source -	Fresh water from construction water supply system
Injection Outlet Depth -	150' btoc
Depth to Packer -	75' btoc
Packer Leak Test (Pass/Fail) -	Pass
Water Level Prior to Injection (ft btoc) -	47.68
Initial Totalizer Reading -	0
Final Totalizer Reading -	7544.13
Approx. Injection Volume (gal) -	7544.13
Calculated Injection Volume (gal) -	7583.04
Calculated and Totalizer Volume	38.91
Number of Injection Steps -	4
Injection Rates (List In Order) -	5, 10, 15, 25 GPM Respectfully

Step 4						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 4 Start (Min)
15:30:20	360.33	21.60	3621.75	15.00	32.68	0.0
15:30:40	360.67	22.02	3629.09	14.04	33.64	0.3
15:31:00	361.00	22.56	3636.61	--	--	0.7
15:32:00	362.00	22.78	3659.39	11.18	36.50	1.7
15:33:00	363.00	23.62	3683.01	10.42	37.26	2.7
15:34:00	364.00	23.90	3706.91	9.27	38.41	3.7
15:35:00	365.00	23.90	3730.81	8.83	38.85	4.7
15:36:00	366.00	24.23	3755.04	8.36	39.32	5.7
15:37:00	367.00	24.23	3779.27	8.28	39.40	6.7
15:38:00	368.00	24.22	3803.49	8.23	39.45	7.7
15:39:00	369.00	24.22	3827.71	8.23	39.45	8.7
15:40:00	370.00	24.72	3852.43	8.24	39.44	9.7
15:42:00	372.00	24.20	3900.83	8.29	39.39	11.7
15:44:00	374.00	24.20	3949.23	8.30	39.38	13.7
15:46:00	376.00	24.20	3997.63	8.32	39.36	15.7
15:48:00	378.00	24.18	4045.99	8.34	39.34	17.7
15:50:00	380.00	24.06	4094.11	8.42	39.26	19.7
15:52:00	382.00	23.30	4140.71	10.56	37.12	21.7
15:54:00	384.00	24.18	4189.07	9.46	38.22	23.7
15:56:00	386.00	23.60	4236.27	10.42	37.26	25.7
15:58:00	388.00	24.28	4284.83	8.55	39.13	27.7
16:00:00	390.00	20.88	4326.59	13.50	34.18	29.7
16:05:00	395.00	25.44	4453.79	7.09	40.59	34.7
16:10:00	400.00	25.27	4580.14	6.42	41.26	39.7
16:15:00	405.00	23.88	4699.54	9.58	38.10	44.7
16:20:00	410.00	21.74	4808.24	13.39	34.29	49.7
16:25:00	415.00	25.36	4935.04	6.27	41.41	54.7
16:30:00	420.00	23.12	5050.64	10.78	36.90	59.7
16:40:00	430.00	24.86	5299.24	8.11	39.57	69.7
16:50:00	440.00	24.90	5548.24	7.32	40.36	79.7
17:00:00	450.00	24.96	5797.84	7.26	40.42	89.7
17:10:00	460.00	25.00	6047.84	7.17	40.51	99.7
17:20:00	470.00	25.04	6298.24	7.08	40.60	109.7
17:30:00	480.00	25.02	6548.44	7.10	40.58	119.7
17:40:00	490.00	25.02	6798.64	7.09	40.59	129.7
17:50:00	500.00	25.00	7048.64	7.11	40.57	139.7
18:00:00	510.00	24.98	7298.44	7.15	40.53	149.7
18:10:00	520.00	28.46	7583.04	1.57	46.11	159.7

Total Volume Injected During Step (GAL):	3968.49
Average Injection Rate (GPM):	24.14
Specific Injectivity (GPM/FT):	0.52

IRZ-21 Lower Screen (141-158 ft) Linear Change in Water Level Plot
Change in Water Level (feet)
Elapsed Time (min)
0
5
10
15
20
25
30
35
40
45
50
0
100
200
300
400
500
600
700
Fresh water poly tank ran low on water and injection pump stopped
Flow rate increase to troubleshoot technical issue within drop pipe.
Step 4:
Total Volume Injected: 3968.49 gal
Avg. Injection Rate: 24.14 gpm
Change in Water Level: 46.11 ft
Specific Injectivity: 0.52 gpm/ft
Recovery Data
Water level meter malfunctioned during the beginning of step and depth to water readings were missed
Step 3:
Total Volume Injected: 1806.59 gal
Avg. Injection Rate: 15.16 gpm
Change in Water Level: 28.21 ft
Specific Injectivity: 0.54 gpm/ft
Step 2:
Total Volume Injected: 1214.88 gal
Avg. Injection Rate: 9.88 gpm
Change in Water Level: 16.24 ft
Specific Injectivity: 0.61 gpm/ft
Step 1:
Total Volume Injected: 593.08 gal
Avg. Injection Rate: 5.33 gpm
Change in Water Level: 7.96 ft
Specific Injectivity: 0.67 gpm/ft
Legend
Transducer
Manual

IRZ-21 Lower Screen (141-158 ft)
Semi-Log Change in Water Level Plot

IRZ-21 Lower Screen (141-158 ft)
Semi-Log Change in Water Level Plot

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID- **IRZ-20**

Well being tested- **IRZ-21 (Lower)**

Task- **Injectivity**

Date	Time	Date+Time	Depth to Water
9/5/2019	10:11	9/5/2019 10:11	43.17
9/5/2019	13:03	9/5/2019 13:03	43.35
9/5/2019	15:29	9/5/2019 15:29	43.21
9/6/2019	9:16	9/6/2019 9:16	43.17
9/6/2019	10:02	9/6/2019 10:02	43.14
9/6/2019	10:15	9/6/2019 10:15	43.18
9/6/2019	11:21	9/6/2019 11:21	43.15
9/6/2019	12:10	9/6/2019 12:10	43.08
9/6/2019	13:24	9/6/2019 13:24	43.13
9/6/2019	14:10	9/6/2019 14:10	43.07
9/6/2019	16:10	9/6/2019 16:10	42.97
9/6/2019	18:20	9/6/2019 18:20	43.26

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID- **IRZ-23**

Well being tested- **IRZ-21 (Lower)**

Task- **Injectivity**

Date	Time	Date+Time	Depth to Water
9/5/2019	10:16	9/5/2019 10:16	47.19
9/5/2019	13:06	9/5/2019 13:06	47.37
9/5/2019	15:33	9/5/2019 15:33	47.36
9/6/2019	9:13	9/6/2019 9:13	47.15
9/6/2019	10:04	9/6/2019 10:04	47.10
9/6/2019	10:12	9/6/2019 10:12	47.13
9/6/2019	11:26	9/6/2019 11:26	47.15
9/6/2019	12:06	9/6/2019 12:06	47.13
9/6/2019	13:29	9/6/2019 13:29	47.13
9/6/2019	14:03	9/6/2019 14:03	47.13
9/6/2019	16:08	9/6/2019 16:08	47.13
9/6/2019	18:18	9/6/2019 18:18	47.26

IRZ-20 Water Level During Well IRZ-21 Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-21: 71' 3"
Legend
Transducer
Manual
Flow rate increased to troubleshoot technical issue within drop pipe.
Fresh water poly tank ran low on water and injection pump stopped
Depth to Water (feet)
42.6
42.8
43
43.2
43.4
43.6
9/6/19 6:00
9/6/19 9:00
9/6/19 12:00
9/6/19 15:00
9/6/19 18:00
9/6/19 21:00
Date and Time
Step 1:
Total Volume Injected: 593.08 gal
Avg. Injection Rate: 5.33 gpm
Change in Water Level in IRZ-21: 7.96 ft
Specific Injectivity: 0.67 gpm/ft
Step 2:
Total Volume Injected: 1214.88 gal
Avg. Injection Rate: 9.88 gpm
Change in Water Level in IRZ-21: 16.24 ft
Specific Injectivity: 0.61 gpm/ft
Step 3:
Total Volume Injected: 1806.59 gal
Avg. Injection Rate: 15.16 gpm
Change in Water Level in IRZ-21: 28.21 ft
Specific Injectivity: 0.54 gpm/ft
Step 4:
Total Volume Injected: 3968.49 gal
Avg. Injection Rate: 24.14 gpm
Change in Water Level in IRZ-21: 46.11 ft
Specific Injectivity: 0.52 gpm/ft

IRZ-23 Water Level During Well IRZ-21 Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-21: 149' 5"
Legend
Transducer
Manual
Flow rate increase to troubleshoot technical issue within drop pipe.
Fresh water poly tank ran low on water and injection pump stopped
Depth to Water (feet)
46.8
47
47.2
47.4
47.6
9/6/19 6:00
9/6/19 9:00
9/6/19 12:00
9/6/19 15:00
9/6/19 18:00
9/6/19 21:00
Date and Time
Step 1:
Total Volume Injected: 593.08 gal
Avg. Injection Rate: 5.33 gpm
Change in Water Level in IRZ-21: 7.96 ft
Specific Injectivity: 0.67 gpm/ft
Step 2:
Total Volume Injected: 1214.88 gal
Avg. Injection Rate: 9.88 gpm
Change in Water Level in IRZ-21: 16.24 ft
Specific Injectivity: 0.61 gpm/ft
Step 3:
Total Volume Injected: 1806.59 gal
Avg. Injection Rate: 15.16 gpm
Change in Water Level in IRZ-21: 28.21 ft
Specific Injectivity: 0.54 gpm/ft
Step 4:
Total Volume Injected: 3968.49 gal
Avg. Injection Rate: 24.14 gpm
Change in Water Level in IRZ-21: 46.11 ft
Specific Injectivity: 0.52 gpm/ft

MW-20-070 Water Level During Well IRZ-21 Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
*No manual water levels were collected. Actual water level depth not reflected.
Legend
Transducer
Flow rate increased to troubleshoot technical issue within drop pipe.
Fresh water poly tank ran low on water and injection pump stopped
Step 1:
Total Volume Injected: 593.08 gal
Avg. Injection Rate: 5.33 gpm
Change in Water Level in IRZ-21: 7.96 ft
Specific Injectivity: 0.67 gpm/ft
Step 2:
Total Volume Injected: 1214.88 gal
Avg. Injection Rate: 9.88 gpm
Change in Water Level in IRZ-21: 16.24 ft
Specific Injectivity: 0.61 gpm/ft
Step 3:
Total Volume Injected: 1806.59 gal
Avg. Injection Rate: 15.16 gpm
Change in Water Level in IRZ-21: 28.21 ft
Specific Injectivity: 0.54 gpm/ft
Step 4:
Total Volume Injected: 3968.49 gal
Avg. Injection Rate: 24.14 gpm
Change in Water Level in IRZ-21: 46.11 ft
Specific Injectivity: 0.52 gpm/ft
Level (feet)*
44.6
44.8
45
45.2
45.4
9/6/19 6:00
9/6/19 9:00
9/6/19 12:00
9/6/19 15:00
9/6/19 18:00
9/6/19 21:00
Date and Time

MW-20-100 Water Level During Well IRZ-21 Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
*No manual water levels were collected. Actual water level depth not reflected.
Legend
Transducer
Flow rate increased to troubleshoot technical issue within drop pipe.
Fresh water poly tank ran low on water and injection pump stopped
Step 1:
Total Volume Injected: 593.08 gal
Avg. Injection Rate: 5.33 gpm
Change in Water Level in IRZ-21: 7.96 ft
Specific Injectivity: 0.67 gpm/ft
Step 2:
Total Volume Injected: 1214.88 gal
Avg. Injection Rate: 9.88 gpm
Change in Water Level in IRZ-21: 16.24 ft
Specific Injectivity: 0.61 gpm/ft
Step 3:
Total Volume Injected: 1806.59 gal
Avg. Injection Rate: 15.16 gpm
Change in Water Level in IRZ-21: 28.21 ft
Specific Injectivity: 0.54 gpm/ft
Step 4:
Total Volume Injected: 3968.49 gal
Avg. Injection Rate: 24.14 gpm
Change in Water Level in IRZ-21: 46.11 ft
Specific Injectivity: 0.52 gpm/ft
Level (feet)*
85
85.2
85.4
85.6
85.8
86
86.2
9/6/19 6:00
9/6/19 9:00
9/6/19 12:00
9/6/19 15:00
9/6/19 18:00
9/6/19 21:00
Date and Time

MW-20-130B Water Level During Well IRZ-21 Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
*No manual water levels were collected. Actual water level depth not reflected.
Flow rate increased to troubleshoot technical issue within drop pipe.
Fresh water poly tank ran low on water and injection pump stopped
Legend
Transducer
Level (feet)*
42.8
43
43.2
43.4
43.6
43.8
44
44.2
9/6/19 6:00
9/6/19 9:00
9/6/19 12:00
9/6/19 15:00
9/6/19 18:00
9/6/19 21:00
Date and Time
Step 1:
Total Volume Injected: 593.08 gal
Avg. Injection Rate: 5.33 gpm
Change in Water Level in IRZ-21: 7.96 ft
Specific Injectivity: 0.67 gpm/ft
Step 2:
Total Volume Injected: 1214.88 gal
Avg. Injection Rate: 9.88 gpm
Change in Water Level in IRZ-21: 16.24 ft
Specific Injectivity: 0.61 gpm/ft
Step 3:
Total Volume Injected: 1806.59 gal
Avg. Injection Rate: 15.16 gpm
Change in Water Level in IRZ-21: 28.21 ft
Specific Injectivity: 0.54 gpm/ft
Step 4:
Total Volume Injected: 3968.49 gal
Avg. Injection Rate: 24.14 gpm
Change in Water Level in IRZ-21: 46.11 ft
Specific Injectivity: 0.52 gpm/ft

MW-31-60 Water Level During Well IRZ-21 Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
*No manual water levels were collected. Actual water level depth not reflected.
Legend
Transducer
Flow rate increased to troubleshoot technical issue within drop pipe.
Fresh water poly tank ran low on water and injection pump stopped
Step 1:
Total Volume Injected: 593.08 gal
Avg. Injection Rate: 5.33 gpm
Change in Water Level in IRZ-21: 7.96 ft
Specific Injectivity: 0.67 gpm/ft
Step 2:
Total Volume Injected: 1214.88 gal
Avg. Injection Rate: 9.88 gpm
Change in Water Level in IRZ-21: 16.24 ft
Specific Injectivity: 0.61 gpm/ft
Step 3:
Total Volume Injected: 1806.59 gal
Avg. Injection Rate: 15.16 gpm
Change in Water Level in IRZ-21: 28.21 ft
Specific Injectivity: 0.54 gpm/ft
Step 4:
Total Volume Injected: 3968.49 gal
Avg. Injection Rate: 24.14 gpm
Change in Water Level in IRZ-21: 46.11 ft
Specific Injectivity: 0.52 gpm/ft
Level (feet)*
43.4
43.6
43.8
44
44.2
44.4
9/6/19 6:00
9/6/19 9:00
9/6/19 12:00
9/6/19 15:00
9/6/19 18:00
9/6/19 21:00
Date and Time

MW-31-135 Water Level During Well IRZ-21 Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
*No manual water levels were collected. Actual water level depth not reflected.
Legend
Transducer
Flow rate increased to troubleshoot technical issue within drop pipe.
Fresh water poly tank ran low on water and injection pump stopped
Level (feet)*
51.2
51.4
51.6
51.8
52
52.2
52.4
9/6/19 6:00
9/6/19 9:00
9/6/19 12:00
9/6/19 15:00
9/6/19 18:00
9/6/19 21:00
Date and Time
Step 1:
Total Volume Injected: 593.08 gal
Avg. Injection Rate: 5.33 gpm
Change in Water Level in IRZ-21: 7.96 ft
Specific Injectivity: 0.67 gpm/ft
Step 2:
Total Volume Injected: 1214.88 gal
Avg. Injection Rate: 9.88 gpm
Change in Water Level in IRZ-21: 16.24 ft
Specific Injectivity: 0.61 gpm/ft
Step 3:
Total Volume Injected: 1806.59 gal
Avg. Injection Rate: 15.16 gpm
Change in Water Level in IRZ-21: 28.21 ft
Specific Injectivity: 0.54 gpm/ft
Step 4:
Total Volume Injected: 3968.49 gal
Avg. Injection Rate: 24.14 gpm
Change in Water Level in IRZ-21: 46.11 ft
Specific Injectivity: 0.52 gpm/ft

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	**IRZ-23**
Date -	**8/12/2019**
Screened Interval Tested -	**93-143 ft**
Packer Set Depth -	**N/A**
Packer Seal Test -	N/A
Tests Conducted -	3 step Specific Capacity Test (32.5, 65, 97.5 GPM)
Purpose -	Well Performance Test
Summary -	Specific Capacity: 9.02-9.58 GPM/FT
Notes -	Inconsistent pumping rate during start of Step 1 Transducer inadvertently adjusted during Step 2

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	**IRZ-23**
Date -	**8/12/2019**
Screened Interval -	**93-143**
Initial Water Level Within 93-143 -	**45.18**
Initial Totalizer Reading -	**0**
Final Totalizer Reading -	**23361.8**
Approx. Pumped Volume (gal) -	**23361.8**
Number of Specific Capacity Steps -	**3**
Pumping Rates (List In Order) -	**32.5, 65, and 97.5 Respectfully**

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)
Step 1						
9:00:00	0.0	0.0	0.00	0.00	45.18	0
9:00:20	0.3	0.3	36.48	12.16	47.80	2.62
9:00:40	0.3	0.7	27.25	21.24	48.19	3.01
9:01:00	0.3	1.0	31.89	31.87	48.05	2.87
9:02:00	1.0	2.0	32.82	64.69	48.40	3.22
9:03:00	1.0	3.0	32.82	97.51	48.48	3.3
9:04:00	1.0	4.0	32.70	130.21	48.50	3.32
9:05:00	1.0	5.0	32.70	162.91	48.50	3.32
9:06:00	1.0	6.0	32.58	195.49	48.50	3.32
9:07:00	1.0	7.0	32.46	227.95	48.50	3.32
9:08:00	1.0	8.0	32.58	260.53	48.50	3.32
9:09:00	1.0	9.0	32.34	292.87	48.50	3.32
9:10:00	1.0	10.0	32.34	325.21	48.50	3.32
9:12:00	2.0	12.0	32.34	389.89	48.51	3.33
9:14:00	2.0	14.0	32.34	454.57	48.51	3.33
9:16:00	2.0	16.0	32.46	519.49	48.51	3.33
9:18:00	2.0	18.0	32.34	584.17	48.51	3.33
9:20:00	2.0	20.0	32.34	648.85	48.51	3.33
9:22:00	2.0	22.0	32.34	713.53	48.51	3.33
9:24:00	2.0	24.0	32.46	778.45	48.52	3.34
9:26:00	2.0	26.0	32.34	843.13	48.52	3.34
9:28:00	2.0	28.0	32.34	907.81	48.52	3.34
9:30:00	2.0	30.0	32.34	972.49	48.52	3.34
9:35:00	5.0	35.0	32.34	1134.19	48.52	3.34
9:40:00	5.0	40.0	32.46	1296.49	48.53	3.35
9:45:00	5.0	45.0	32.34	1458.19	48.53	3.35
9:50:00	5.0	50.0	32.34	1619.89	48.54	3.36
9:55:00	5.0	55.0	32.34	1781.59	48.54	3.36
10:00:00	5.0	60.0	32.34	1943.29	48.54	3.36
10:10:00	10.0	70.0	32.34	2266.69	48.53	3.35
10:20:00	10.0	80.0	32.34	2590.09	48.54	3.36
10:30:00	10.0	90.0	32.34	2913.49	48.55	3.37
10:40:00	10.0	100.0	32.34	3236.89	48.55	3.37
10:50:00	10.0	110.0	32.34	3560.29	48.55	3.37
11:00:00	10.0	120.0	32.34	3883.69	48.56	3.38

Total Volume Pumped for Step 1 (GAL):	3883.69
Average Pumping Rate (GPM):	32.38
Specific Capacity (GPM/FT):	9.58

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	**IRZ-23**
Date -	**8/12/2019**
Screened Interval -	**93-143**
Initial Water Level Within 93-143 -	**45.18**
Initial Totalizer Reading -	**0**
Final Totalizer Reading -	**23361.8**
Approx. Pumped Volume (gal) -	**23361.8**
Number of Specific Capacity Steps -	**3**
Pumping Rates (List In Order) -	**32.5, 65, and 97.5 Respectfully**

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 2 Start (Min)
Step 2							
11:00:20	0.3	120.3	71.53	3907.54	50.20	5.02	0.3
11:00:40	0.3	120.7	65.50	3929.37	51.41	6.23	0.7
11:01:00	0.3	121.0	65.27	3951.13	51.78	6.6	1.0
11:02:00	1.0	122.0	65.27	4016.40	51.98	6.8	2.0
11:03:00	1.0	123.0	65.27	4081.67	52.08	6.9	3.0
11:04:00	1.0	124.0	65.39	4147.06	52.12	6.94	4.0
11:05:00	1.0	125.0	65.50	4212.56	52.13	6.95	5.0
11:06:00	1.0	126.0	65.39	4277.95	52.15	6.97	6.0
11:07:00	1.0	127.0	65.39	4343.34	52.16	6.98	7.0
11:08:00	1.0	128.0	65.39	4408.73	52.16	6.98	8.0
11:09:00	1.0	129.0	65.39	4474.12	52.17	6.99	9.0
11:10:00	1.0	130.0	65.27	4539.39	52.17	6.99	10.0
11:12:00	2.0	132.0	65.15	4669.69	52.18	7	12.0
11:14:00	2.0	134.0	65.15	4799.99	52.18	7	14.0
11:16:00	2.0	136.0	65.27	4930.53	52.18	7	16.0
11:18:00	2.0	138.0	65.15	5060.83	52.19	7.01	18.0
11:20:00	2.0	140.0	65.27	5191.37	52.19	7.01	20.0
11:22:00	2.0	142.0	65.27	5321.91	52.19	7.01	22.0
11:24:00	2.0	144.0	65.27	5452.45	52.20	7.02	24.0
11:26:00	2.0	146.0	65.27	5582.99	52.20	7.02	26.0
11:28:00	2.0	148.0	65.15	5713.29	52.21	7.03	28.0
11:30:00	2.0	150.0	65.27	5843.83	52.21	7.03	30.0
11:35:00	5.0	155.0	65.15	6169.58	52.21	7.03	35.0
11:40:00	5.0	160.0	65.15	6495.33	52.21	7.03	40.0
11:45:00	5.0	165.0	65.50	6822.83	52.23	7.05	45.0
11:50:00	5.0	170.0	65.50	7150.33	52.24	7.06	50.0
11:55:00	5.0	175.0	65.50	7477.83	52.25	7.07	55.0
12:00:00	5.0	180.0	65.50	7805.33	52.26	7.08	60.0
12:10:00	10.0	190.0	65.50	8460.33	52.26	7.08	70.0
12:20:00	10.0	200.0	65.50	9115.33	52.27	7.09	80.0
12:30:00	10.0	210.0	65.50	9770.33	52.28	7.1	90.0
12:40:00	10.0	220.0	65.98	10430.13	52.34	7.16	100.0
12:50:00	10.0	230.0	66.10	11091.13	52.38	7.2	110.0
13:00:00	10.0	240.0	66.22	11753.33	52.40	7.22	120.0

Total Volume Pumped for Step 2 (GAL):	7869.63
Average Pumping Rate (GPM):	65.58
Specific Capacity (GPM/FT):	9.08

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	**IRZ-23**
Date -	**8/12/2019**
Screened Interval -	**93-143**
Initial Water Level Within 93-143 -	**45.18**
Initial Totalizer Reading -	**0**
Final Totalizer Reading -	**23361.8**
Approx. Pumped Volume (gal) -	**23361.8**
Number of Specific Capacity Steps -	**3**
Pumping Rates (List In Order) -	**32.5, 65, and 97.5 Respectfully**

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 3 Start (Min)
Step 3							
13:00:20	0.3	240.3	96.79	11785.59	54.10	8.92	0.3
13:00:40	0.3	240.7	96.56	11817.78	54.85	9.67	0.7
13:01:00	0.3	241.0	96.56	11849.96	55.30	10.12	1.0
13:02:00	1.0	242.0	96.56	11946.52	55.61	10.43	2.0
13:03:00	1.0	243.0	96.56	12043.08	55.70	10.52	3.0
13:04:00	1.0	244.0	96.90	12139.98	55.74	10.56	4.0
13:05:00	1.0	245.0	96.67	12236.65	55.77	10.59	5.0
13:06:00	1.0	246.0	96.67	12333.32	55.78	10.6	6.0
13:07:00	1.0	247.0	96.56	12429.88	55.79	10.61	7.0
13:08:00	1.0	248.0	96.56	12526.44	55.80	10.62	8.0
13:09:00	1.0	249.0	96.67	12623.11	55.80	10.62	9.0
13:10:00	1.0	250.0	96.79	12719.90	55.80	10.62	10.0
13:12:00	2.0	252.0	96.67	12913.24	55.81	10.63	12.0
13:14:00	2.0	254.0	96.67	13106.58	55.81	10.63	14.0
13:16:00	2.0	256.0	96.67	13299.92	55.81	10.63	16.0
13:18:00	2.0	258.0	96.67	13493.26	55.82	10.64	18.0
13:20:00	2.0	260.0	96.56	13686.38	55.83	10.65	20.0
13:22:00	2.0	262.0	96.56	13879.50	55.84	10.66	22.0
13:24:00	2.0	264.0	96.44	14072.38	55.84	10.66	24.0
13:26:00	2.0	266.0	96.44	14265.26	55.84	10.66	26.0
13:28:00	2.0	268.0	96.44	14458.14	55.84	10.66	28.0
13:30:00	2.0	270.0	96.44	14651.02	55.84	10.66	30.0
13:35:00	5.0	275.0	96.56	15133.82	55.85	10.67	35.0
13:40:00	5.0	280.0	96.67	15617.17	55.86	10.68	40.0
13:45:00	5.0	285.0	96.44	16099.37	55.86	10.68	45.0
13:50:00	5.0	290.0	96.67	16582.72	55.87	10.69	50.0
13:55:00	5.0	295.0	96.32	17064.32	55.86	10.68	55.0
14:00:00	5.0	300.0	96.32	17545.92	55.86	10.68	60.0
14:10:00	10.0	310.0	96.67	18512.62	55.88	10.7	70.0
14:20:00	10.0	320.0	96.44	19477.02	55.88	10.7	80.0
14:30:00	10.0	330.0	96.67	20443.72	55.89	10.71	90.0
14:40:00	10.0	340.0	96.08	21404.52	55.88	10.7	100.0
14:50:00	10.0	350.0	96.32	22367.72	55.89	10.71	110.0
15:00:00	10.0	360.0	96.32	23330.92	55.89	10.71	120.0

Total Volume Pumped for Step 3 (GAL):	11577.60
Average Pumping Rate (GPM):	96.56
Specific Capacity (GPM/FT):	9.02

Well IRZ-23 Variable Rate Drawdown Plot
Drawdown (feet)
Elapsed Time (min)
0
2
4
6
8
10
12
0
50
100
150
200
250
300
350
400
Legend
Transducer
Manual
Step 1:
Step 1 Total Volume Pumped: 3883.7 gal
Avg. Flow Rate: 32.38 gpm
Drawdown: 3.38 ft
Specific Capacity: 9.58 gpm/ft
Step 2:
Step 2 Total Volume Pumped: 7869.63 gal
Avg. Flow Rate: 65.58 gpm
Drawdown: 7.22 ft
Specific Capacity: 9.08 gpm/ft
Transducer depth inadvertently
Step 3:
Step 3 Total Volume Pumped: 11577.60 gal
Avg. Flow Rate: 96.56 gpm
Drawdown: 10.71 ft
Specific Capacity: 9.02 gpm/ft

Well IRZ-23 Variable Rate Test Plot
Drawdown (feet)
0
2
4
6
8
10
12
14
0.01
0.1
1
10
100
Step 1 Elapsed Time (min)
Inconsistent Pumping Rate
Step 1:
Step 1 Total Volume Pumped: 3883.7 gal
Avg. Flow Rate: 32.38 gpm
Drawdown: 3.38 ft
Specific Capacity: 9.58 gpm/ft
Step 2 Elapsed Time (min)
Transducer depth inadvertently adjusted
Step 2:
Step 2 Total Volume Pumped: 7869.63 gal
Avg. Flow Rate: 65.58 gpm
Drawdown: 7.22 ft
Specific Capacity: 9.08 gpm/ft
Step 3 Elapsed Time (min)
Legend
Transducer
Manual
Step 3:
Step 3 Total Volume Pumped: 11577.60 gal
Avg. Flow Rate: 96.56 gpm
Drawdown: 10.71 ft
Specific Capacity: 9.02 gpm/ft

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	**IRZ-25**
Date -	**9/23/2019**
Screened Interval Tested -	**Lower Screen (50-67 ft)**
Packer Set Depth -	**74-78 ft btoc**
Packer Seal Test -	Confirmed packer to be watertight before test
Tests Conducted -	4 step Specific Capacity Test (9, 18, 27, 36 GPM)
Purpose -	Well Performance Test
Summary -	Specific Capacity: 3.46-5.00 GPM/FT
Notes -	
	Inconsistent pumping rate at beginning of Step 1
	STOP WORK during 27 GPM step due to lightning - Missing manual readings from 1157 - 1340. STOP WORK during final recovery - Missing final manual recovery readings after 1601
	Transducer was inadvertantly started a hour late during step 4 of test.
Oversight Signature -	
Date -	11/5/2019

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	IRZ-25
Date -	9/23/2019
Screened Interval -	50-67
Pump Depth (ft btoc) -	67
Packer Depth (ft btoc) -	74
Packer Leak Test (Pass/Fail) -	Pass
Initial Water Level Within 50'-67' -	45.88
Initial Water Level Within 77'-100' -	45.72
Initial Totalizer Reading (gal) -	0
Final Totalizer Reading (gal) -	11072.1
Approx. Pumped Volume (gal) -	11072.1
Calculated Volume Purged (gal) -	11112.24
Differnce in volume Pumped vs. Calculated -	40.14
Number of Specific Capacity Steps -	4
Pumping Rates (List In Order) -	9, 18, 27, 36/Max

Notes - STOP WORK during 27 GPM step due to lightning - Missing manual readings from 1157 - 1340. STOP WORK during final recovery - Missing manual recovery final readings after 1601

Step 1						
Time (HR:MN:SEC)	Change in Time between Measurements (Min)	Elapsed Time (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)
7:50:00	0	0	15.62	0.00	47.9	2.02
7:50:20	0.3	0.33	6.81	2.27	47.9	2.02
7:50:40	0.3	0.67	7.18	4.66	48.15	2.27
7:51:00	0.3	1.00	9.2	7.73	47.58	1.7
7:52:00	1.0	2.00	9.23	16.96	47.25	1.37
7:53:00	1.0	3.00	9.18	26.14	47.32	1.44
7:54:00	1.0	4.00	9	35.14	47.34	1.46
7:55:00	1.0	5.00	8.99	44.13	47.35	1.47
7:56:00	1.0	6.00	8.99	53.12	47.35	1.47
7:57:00	1.0	7.00	9	62.12	47.36	1.48
7:58:00	1.0	8.00	8.97	71.09	47.37	1.49
7:59:00	1.0	9.00	8.99	80.08	47.4	1.52
8:00:00	1.0	10.00	8.99	89.07	47.4	1.52
8:02:00	2.0	12.00	8.99	107.05	47.43	1.55
8:04:00	2.0	14.00	8.99	125.03	47.45	1.57
8:06:00	2.0	16.00	9	143.03	47.46	1.58
8:08:00	2.0	18.00	9	161.03	47.48	1.6
8:10:00	2.0	20.00	9	179.03	47.48	1.6
8:12:00	2.0	22.00	9.02	197.07	47.51	1.63
8:14:00	2.0	24.00	9	215.07	47.51	1.63
8:16:00	2.0	26.00	9	233.07	47.52	1.64
8:18:00	2.0	28.00	9.02	251.11	47.52	1.64
8:20:00	2.0	30.00	9.02	269.15	47.52	1.64
8:25:00	5.0	35.00	9.02	314.25	47.58	1.7
8:30:00	5.0	40.00	9.02	359.35	47.58	1.7
8:35:00	5.0	45.00	9.04	404.55	47.6	1.72
8:40:00	5.0	50.00	9.04	449.75	47.61	1.73
8:45:00	5.0	55.00	9.04	494.95	47.62	1.74
8:50:00	5.0	60.00	9.04	540.15	47.63	1.75
9:00:00	10.0	70.00	9.06	630.75	47.65	1.77
9:10:00	10.0	80.00	9.04	721.15	47.65	1.77
9:20:00	10.0	90.00	9.05	811.65	47.67	1.79
9:30:00	10.0	100.00	9.05	902.15	47.69	1.81
9:40:00	10.0	110.00	9.05	992.65	47.69	1.81
9:50:00	10.0	120.00	9.06	1083.25	47.7	1.82

Total Volume Pumped for Step 1 (GAL):	1083.25
Average Pumping Rate (GPM):	9.11
Specific Capacity (GPM/FT):	5.00

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	IRZ-25
Date -	9/23/2019
Screened Interval -	50-67
Pump Depth (ft btoc) -	67
Packer Depth (ft btoc) -	74
Packer Leak Test (Pass/Fail) -	Pass
Initial Water Level Within 50'-67' -	45.88
Initial Water Level Within 77'-100' -	45.72
Initial Totalizer Reading (gal) -	0
Final Totalizer Reading (gal) -	11072.1
Approx. Pumped Volume (gal) -	11072.1
Calculated Volume Purged (gal) -	11112.24
Differnce in volume Pumped vs. Calculated -	40.14
Number of Specific Capacity Steps -	4
Pumping Rates (List In Order) -	9, 18, 27, 36/Max
Notes -	STOP WORK during 27 GPM step due to lightning - Missing manual readings from 1157 - 1340. STOP WORK during final recovery - Missing manual recovery final readings after 1601

Step 2

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 2 Start (Min)
9:50:20	0.3	120.33	14.54	1088.10	48.1	2.22	0.3
9:50:40	0.3	120.67	15.88	1093.39	48.38	2.5	0.7
9:51:00	0.3	121.00	16.7	1098.96	48.56	2.68	1.0
9:52:00	1.0	122.00	18.03	1116.99	49	3.12	2.0
9:53:00	1.0	123.00	18.05	1135.04	49.2	3.32	3.0
9:54:00	1.0	124.00	17.92	1152.96	49.3	3.42	4.0
9:55:00	1.0	125.00	18.06	1171.02	49.37	3.49	5.0
9:56:00	1.0	126.00	18.03	1189.05	49.4	3.52	6.0
9:57:00	1.0	127.00	18.05	1207.10	49.42	3.54	7.0
9:58:00	1.0	128.00	18.15	1225.25	49.45	3.57	8.0
9:59:00	1.0	129.00	18.03	1243.28	49.46	3.58	9.0
10:00:00	1.0	130.00	18	1261.28	49.45	3.57	10.0
10:02:00	2.0	132.00	18	1297.28	49.46	3.58	12.0
10:04:00	2.0	134.00	18.12	1333.52	49.46	3.58	14.0
10:06:00	2.0	136.00	18.08	1369.68	49.47	3.59	16.0
10:08:00	2.0	138.00	18.13	1405.94	49.48	3.6	18.0
10:10:00	2.0	140.00	18.05	1442.04	49.5	3.62	20.0
10:12:00	2.0	142.00	17.99	1478.02	49.51	3.63	22.0
10:14:00	2.0	144.00	18.03	1514.08	49.52	3.64	24.0
10:16:00	2.0	146.00	18	1550.08	49.53	3.65	26.0
10:18:00	2.0	148.00	18.08	1586.24	49.53	3.65	28.0
10:20:00	2.0	150.00	18.02	1622.28	49.53	3.65	30.0
10:25:00	5.0	155.00	18.03	1712.43	49.55	3.67	35.0
10:30:00	5.0	160.00	18.06	1802.73	49.56	3.68	40.0
10:35:00	5.0	165.00	18.12	1893.33	49.58	3.7	45.0
10:40:00	5.0	170.00	18.18	1984.23	49.59	3.71	50.0
10:45:00	5.0	175.00	18.12	2074.83	49.6	3.72	55.0
10:50:00	5.0	180.00	18.09	2165.28	49.6	3.72	60.0
11:00:00	10.0	190.00	18.13	2346.58	49.62	3.74	70.0
11:10:00	10.0	200.00	18.13	2527.88	49.74	3.86	80.0
11:20:00	10.0	210.00	18.02	2708.08	49.82	3.94	90.0
11:30:00	10.0	220.00	18.1	2889.08	49.87	3.99	100.0
11:40:00	10.0	230.00	18.08	3069.88	49.9	4.02	110.0
11:50:00	10.0	240.00	18.08	3250.68	49.95	4.07	120.0

Total Volume Pumped for Step 2 (GAL):	2167.43
Average Pumping Rate (GPM):	17.86
Specific Capacity (GPM/FT):	4.39

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	IRZ-25
Date -	9/23/2019
Screened Interval -	50-67
Pump Depth (ft btoc) -	67
Packer Depth (ft btoc) -	74
Packer Leak Test (Pass/Fail) -	Pass
Initial Water Level Within 50'-67' -	45.88
Initial Water Level Within 77'-100' -	45.72
Initial Totalizer Reading (gal) -	0
Final Totalizer Reading (gal) -	11072.1
Approx. Pumped Volume (gal) -	11072.1
Calculated Volume Purged (gal) -	11112.24
Differnce in volume Pumped vs. Calculated -	40.14
Number of Specific Capacity Steps -	4
Pumping Rates (List In Order) -	9, 18, 27, 36/Max
Notes -	STOP WORK during 27 GPM step due to lightning - Missing manual readings from 1157 - 1340. STOP WORK during final recovery - Missing manual recovery final readings after 1601

Step 3							
Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 3 Start (Min)
11:50:20	0.3	240.33	24.94	3258.99	50.45	4.57	0.3
11:50:40	0.3	240.67	24.66	3267.21	50.45	4.57	0.7
11:51:00	0.3	241.00	25.1	3275.58	50.55	4.67	1.0
11:52:00	1.0	242.00	26.88	3302.46	50.94	5.06	2.0
11:53:00	1.0	243.00	26.13	3328.59	51.22	5.34	3.0
11:54:00	1.0	244.00	26.58	3355.17	51.22	5.34	4.0
11:55:00	1.0	245.00	27.35	3382.52	51.22	5.34	5.0
11:56:00	1.0	246.00	27.12	3409.64	51.34	5.46	6.0
13:50:00	114.0	360.00	26.82	6467.12	52.92	7.04	120.0
14:00:00	10.0	370.00	26.61	6733.22	52.98	7.1	130.0
Total Volume Pumped for Step 3 (GAL):			3492.35				
Average Pumping Rate (GPM):			26.22				
Specific Capacity (GPM/FT):			3.60				

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	IRZ-25
Date -	9/23/2019
Screened Interval -	50-67
Pump Depth (ft btoc) -	67
Packer Depth (ft btoc) -	74
Packer Leak Test (Pass/Fail) -	Pass
Initial Water Level Within 50'-67' -	45.88
Initial Water Level Within 77'-100' -	45.72
Initial Totalizer Reading (gal) -	0
Final Totalizer Reading (gal) -	11072.1
Approx. Pumped Volume (gal) -	11072.1
Calculated Volume Purged (gal) -	11112.24
Differnce in volume Pumped vs. Calculated -	40.14
Number of Specific Capacity Steps -	4
Pumping Rates (List In Order) -	9, 18, 27, 36/Max
Notes -	STOP WORK during 27 GPM step due to lightning - Missing manual readings from 1157 - 1340. STOP WORK during final recovery - Missing manual recovery final readings after 1601

Step 4

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 4 Start (Min)
14:00:20	0.3	370.33	29.42	6743.02	53.17	7.29	0.3
14:00:40	0.3	370.67	34.52	6754.53	53.25	7.37	0.3
14:01:00	0.3	371.00	35.22	6766.27	53.46	7.58	0.7
14:02:00	1.0	372.00	35.9	6802.17	54.08	8.2	1.7
14:03:00	1.0	373.00	36.69	6838.86	54.4	8.52	2.7
14:04:00	1.0	374.00	36.36	6875.22	54.62	8.74	3.7
14:05:00	1.0	375.00	36.42	6911.64	54.76	8.88	4.7
14:06:00	1.0	376.00	35.94	6947.58	54.91	9.03	5.7
14:07:00	1.0	377.00	36.1	6983.68	54.97	9.09	6.7
14:08:00	1.0	378.00	36.08	7019.76	55.02	9.14	7.7
14:09:00	1.0	379.00	36.22	7055.98	55.09	9.21	8.7
14:10:00	1.0	380.00	35.71	7091.69	55.13	9.25	9.7
14:12:00	2.0	382.00	35.24	7162.17	55.22	9.34	11.7
14:14:00	2.0	384.00	36.24	7234.65	55.37	9.49	13.7
14:16:00	2.0	386.00	36.16	7306.97	55.36	9.48	15.7
14:18:00	2.0	388.00	36.04	7379.05	55.41	9.53	17.7
14:20:00	2.0	390.00	36.17	7451.39	55.46	9.58	19.7
14:22:00	2.0	392.00	36.47	7524.33	55.49	9.61	21.7
14:24:00	2.0	394.00	36.48	7597.29	55.55	9.67	23.7
14:26:00	2.0	396.00	36.12	7669.53	55.56	9.68	25.7
14:28:00	2.0	398.00	36.52	7742.57	55.58	9.7	27.7
14:30:00	2.0	400.00	36.36	7815.29	55.61	9.73	29.7
14:35:00	5.0	405.00	36.39	7997.24	55.66	9.78	34.7
14:40:00	5.0	410.00	35.99	8177.19	55.72	9.84	39.7
14:45:00	5.0	415.00	35.39	8354.14	55.75	9.87	44.7
14:50:00	5.0	420.00	36.61	8537.19	55.8	9.92	49.7
14:55:00	5.0	425.00	35.51	8714.74	55.85	9.97	54.7
15:00:00	5.0	430.00	38.86	8909.04	55.85	9.97	59.7
15:10:00	10.0	440.00	36.98	9278.84	55.97	10.09	69.7
15:20:00	10.0	450.00	36.38	9642.64	56.05	10.17	79.7
15:30:00	10.0	460.00	36.52	10007.84	56.13	10.25	89.7
15:40:00	10.0	470.00	36.34	10371.24	56.18	10.3	99.7
15:50:00	10.0	480.00	37.34	10744.64	56.24	10.36	109.7
16:00:00	10.0	490.00	36.76	11112.24	56.3	10.42	119.7
16:01:00	1.0	491.00	0	11112.24	50.81	4.93	120.7

Total Volume Pumped for Step 4 (GAL):	4369.22
Average Pumping Rate (GPM):	36.04
Specific Capacity (GPM/FT):	3.46

IRZ-25 Upper Screen (50-67 ft) Linear Drawdown Plot
Drawdown (feet)
Elapsed Time (min)
0
2
4
6
8
10
12
0
100
200
300
400
500
600
700
800
Step 1:
Step 1 Total Volume Pumped: 1083.25 gal
Avg. Flow Rate: 9.11 gpm
Drawdown: 1.82 ft
Specific Capacity: 5.00 gpm/ft
Step 2:
Step 2 Total Volume Pumped: 2167.43 gal
Avg. Flow Rate: 17.86 gpm
Drawdown: 4.07 ft
Specific Capacity: 4.39 gpm/ft
Step 3:
Step 3 Total Volume Pumped: 3492.35 gal
Avg. Flow Rate: 26.22 gpm
Drawdown: 7.1 ft
Specific Capacity: 3.60 gpm/ft
Step 4:
Step 4 Total Volume Pumped: 4369.22 gal
Avg. Flow Rate: 36.04 gpm
Drawdown: 10.42 ft
Specific Capacity: 3.46 gpm/ft
Stop work due to lightning-missing readings
Transducer started an hour after step start
Recovery Data
Legend
Transducer
Manual

IRZ-25 Upper Screen (50-67 ft)
Semi-Log Drawdown Plot

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	**IRZ-25**
Date -	**10/7/2019**
Screened Interval Tested -	**Upper Screen (50-67 ft)**
Packer Set Depth -	**71' bgs**
Packer Seal Test -	Confirmed packer to be watertight before test
Tests Conducted -	4 step Injectivity Test (9.7, 18.5, 27.8, 36.6 gpm)
Purpose -	Well Performance Test
Summary -	Specific Injectivity: 5.35-6.65 GPM/FT
Notes -	
	Flow rate fluctuated during step 1 due to refilling of fresh water tank for injectivity.
	IM3 shut down at ~9:42 and restarted at ~10:52
	Flow rate fluctuated during step 3 due to refilling of fresh water tank for injectivity.
Oversight Signature -	
Date -	11/5/2019

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	IRZ-25 (Upper)
Date -	10/7/2019
Screened Interval -	50'-67'
Injection Water Source -	Fresh water from construction water supply system
Injection Outlet Depth -	57' bgs
Depth to Packer -	71' bgs
Packer Leak Test (Pass/Fail) -	Pass
Water Level Prior to Injection -	46.20
Initial Totalizer Reading -	0
Final Totalizer Reading -	11079.9
Approx. Injection Volume (gal) -	11079.9
Calculated Injection Volume (gal) -	11104.92
Calculated and Totalizer Volume Difference (gal) -	25.02
Number of Injection Steps -	4
Injection Rates (List In Order) -	9.7, 18.5, 27.8, and 36.6 gpm

Notes - Flow rate fluctuated during step 1 due to refilling of fresh water tank for injectivity.

IM3 shut down at ~9:42 and restarted at ~10:52

Flow rate fluctuated during step 3 due to refilling of fresh water tank for injectivity.

Step 1

Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)
8:30:00	0	0.00	0	46.20	0
8:30:20	0.33	11.47	3.82	45.54	0.66
8:30:40	0.67	9.46	6.98	45.58	0.62
8:31:00	1.00	9.44	10.12	45.40	0.8
8:32:00	2.00	9.54	19.66	45.15	1.05
8:33:00	3.00	9.51	29.17	45.04	1.16
8:34:00	4.00	9.44	38.61	44.97	1.23
8:35:00	5.00	9.58	48.19	44.95	1.25
8:36:00	6.00	9.62	57.81	44.91	1.29
8:37:00	7.00	9.60	67.41	44.89	1.31
8:38:00	8.00	9.53	76.94	44.87	1.33
8:39:00	9.00	9.60	86.54	44.86	1.34
8:40:00	10.00	9.54	96.08	44.85	1.35
8:42:00	12.00	9.60	115.28	44.81	1.39
8:44:00	14.00	9.58	134.44	44.79	1.41
8:46:00	16.00	9.58	153.60	44.78	1.42
8:48:00	18.00	9.58	172.76	44.78	1.42
8:50:00	20.00	9.44	191.64	44.75	1.45
8:52:00	22.00	9.46	210.56	44.74	1.46
8:54:00	24.00	9.49	229.54	44.72	1.48
8:56:00	26.00	9.56	248.66	44.71	1.49
8:58:00	28.00	9.46	267.58	44.70	1.5
9:00:00	30.00	9.58	286.74	44.69	1.51
9:05:00	35.00	9.54	334.44	44.67	1.53
9:10:00	40.00	9.40	381.44	44.65	1.55
9:15:00	45.00	9.51	428.99	44.65	1.55
9:20:00	50.00	9.49	476.44	44.63	1.57
9:25:00	55.00	9.49	523.89	44.61	1.59
9:30:00	60.00	9.56	571.69	44.60	1.6
9:40:00	70.00	9.60	667.69	44.58	1.62
9:50:00	80.00	9.49	762.59	44.51	1.69
10:00:00	90.00	9.40	856.59	44.48	1.72
10:10:00	100.00	9.42	950.79	44.44	1.76
10:20:00	110.00	9.51	1045.89	44.40	1.8
10:30:00	120.00	13.02	1176.09	44.39	1.81

Total Volume Injected During Step (GAL):	1176.09
Average Injection Rate (GPM):	9.68
Specific Injectivity (GPM/FT):	5.35

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	IRZ-25 (Upper)
Date -	10/7/2019
Screened Interval -	50'-67'
Injection Water Source -	Fresh water from construction water supply system
Injection Outlet Depth -	57' bgs
Depth to Packer -	71' bgs
Packer Leak Test (Pass/Fail) -	Pass
Water Level Prior to Injection -	46.20
Initial Totalizer Reading -	0
Final Totalizer Reading -	11079.9
Approx. Injection Volume (gal) -	11079.9
Calculated Injection Volume (gal) -	11104.92
Calculated and Totalizer Volume Difference (gal) -	25.02
Number of Injection Steps -	4
Injection Rates (List In Order) -	9.7, 18.5, 27.8, and 36.6 gpm

Notes - Flow rate fluctuated during step 1 due to refilling of fresh water tank for injectivity.

IM3 shut down at ~9:42 and restarted at ~10:52

Flow rate fluctuated during step 3 due to refilling of fresh water tank for injectivity.

Step 2						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 2 Start (Min)
10:30:20	120.33	18.84	1182.37	43.95	2.25	0.0
10:30:40	120.67	18.44	1188.52	43.71	2.49	0.3
10:31:00	121.00	18.58	1194.71	43.56	2.64	0.7
10:32:00	122.00	18.62	1213.33	43.36	2.84	1.7
10:33:00	123.00	18.60	1231.93	43.26	2.94	2.7
10:34:00	124.00	18.52	1250.45	43.21	2.99	3.7
10:35:00	125.00	18.55	1269.00	43.18	3.02	4.7
10:36:00	126.00	18.60	1287.60	43.16	3.04	5.7
10:37:00	127.00	18.60	1306.20	43.14	3.06	6.7
10:38:00	128.00	18.52	1324.72	43.13	3.07	7.7
10:39:00	129.00	18.55	1343.27	43.11	3.09	8.7
10:40:00	130.00	18.62	1361.89	43.09	3.11	9.7
10:42:00	132.00	18.55	1398.99	43.07	3.13	11.7
10:44:00	134.00	18.55	1436.09	43.05	3.15	13.7
10:46:00	136.00	18.50	1473.09	43.04	3.16	15.7
10:48:00	138.00	18.48	1510.05	43.02	3.18	17.7
10:50:00	140.00	18.58	1547.21	43.01	3.19	19.7
10:52:00	142.00	18.55	1584.31	42.99	3.21	21.7
10:54:00	144.00	18.57	1621.45	42.99	3.21	23.7
10:56:00	146.00	18.48	1658.41	42.99	3.21	25.7
10:58:00	148.00	18.48	1695.37	43.01	3.19	27.7
11:00:00	150.00	18.48	1732.33	43.03	3.17	29.7
11:05:00	155.00	18.46	1824.63	43.02	3.18	34.7
11:10:00	160.00	18.50	1917.13	43.03	3.17	39.7
11:15:00	165.00	18.50	2009.63	43.03	3.17	44.7
11:20:00	170.00	18.60	2102.63	43.01	3.19	49.7
11:25:00	175.00	18.46	2194.93	43.01	3.19	54.7
11:30:00	180.00	18.50	2287.43	43.00	3.2	59.7
11:40:00	190.00	18.44	2471.83	43.00	3.2	69.7
11:50:00	200.00	18.48	2656.63	42.99	3.21	79.7
12:00:00	210.00	18.46	2841.23	42.99	3.21	89.7
12:10:00	220.00	18.39	3025.13	42.99	3.21	99.7
12:20:00	230.00	18.48	3209.93	42.99	3.21	109.7
12:30:00	240.00	18.35	3393.43	42.97	3.23	119.7

Total Volume Injected During Step (GAL):	2217.34
Average Injection Rate (GPM):	18.53
Specific Injectivity (GPM/FT):	5.74

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	IRZ-25 (Upper)
Date -	10/7/2019
Screened Interval -	50'-67'
Injection Water Source -	Fresh water from construction water supply system
Injection Outlet Depth -	57' bgs
Depth to Packer -	71' bgs
Packer Leak Test (Pass/Fail) -	Pass
Water Level Prior to Injection -	46.20
Initial Totalizer Reading -	0
Final Totalizer Reading -	11079.9
Approx. Injection Volume (gal) -	11079.9
Calculated Injection Volume (gal) -	11104.92
Calculated and Totalizer Volume Difference (gal) -	25.02
Number of Injection Steps -	4
Injection Rates (List In Order) -	9.7, 18.5, 27.8, and 36.6 gpm

Notes - Flow rate fluctuated during step 1 due to refilling of fresh water tank for injectivity.

IM3 shut down at ~9:42 and restarted at ~10:52

Flow rate fluctuated during step 3 due to refilling of fresh water tank for injectivity.

Step 3						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 3 Start (Min)
12:30:20	240.33	27.67	3402.66	42.59	3.61	0.0
12:30:40	240.67	27.08	3411.68	42.42	3.78	0.3
12:31:00	241.00	27.32	3420.79	42.29	3.91	0.7
12:32:00	242.00	27.11	3447.90	42.12	4.08	1.7
12:33:00	243.00	27.46	3475.36	42.08	4.12	2.7
12:34:00	244.00	27.65	3503.01	41.99	4.21	3.7
12:35:00	245.00	27.79	3530.80	41.96	4.24	4.7
12:36:00	246.00	27.86	3558.66	41.94	4.26	5.7
12:37:00	247.00	27.72	3586.38	41.93	4.27	6.7
12:38:00	248.00	27.44	3613.82	41.92	4.28	7.7
12:39:00	249.00	27.76	3641.58	41.90	4.3	8.7
12:40:00	250.00	27.84	3669.42	41.88	4.32	9.7
12:42:00	252.00	28.00	3725.42	41.86	4.34	11.7
12:44:00	254.00	27.90	3781.22	41.85	4.35	13.7
12:46:00	256.00	28.16	3837.54	41.84	4.36	15.7
12:48:00	258.00	27.67	3892.88	41.82	4.38	17.7
12:50:00	260.00	27.82	3948.52	41.81	4.39	19.7
12:52:00	262.00	27.34	4003.20	41.81	4.39	21.7
12:54:00	264.00	28.12	4059.44	41.80	4.4	23.7
12:56:00	266.00	28.33	4116.10	41.80	4.4	25.7
12:58:00	268.00	28.05	4172.20	41.79	4.41	27.7
13:00:00	270.00	27.93	4228.06	41.78	4.42	29.7
13:05:00	275.00	28.14	4368.76	41.74	4.46	34.7
13:10:00	280.00	28.19	4509.71	41.73	4.47	39.7
13:15:00	285.00	28.30	4651.21	41.74	4.46	44.7
13:20:00	290.00	27.72	4789.81	41.70	4.5	49.7
13:25:00	295.00	28.14	4930.51	41.69	4.51	54.7
13:30:00	300.00	27.56	5068.31	41.68	4.52	59.7
13:40:00	310.00	28.01	5348.41	41.67	4.53	69.7
13:50:00	320.00	27.70	5625.41	41.65	4.55	79.7
14:00:00	330.00	27.46	5900.01	41.64	4.56	89.7
14:10:00	340.00	27.62	6176.21	41.62	4.58	99.7
14:20:00	350.00	27.82	6454.41	41.61	4.59	109.7
14:30:00	360.00	27.88	6733.21	41.61	4.59	119.7

Total Volume Injected During Step (GAL):	3339.78
Average Injection Rate (GPM):	27.78
Specific Injectivity (GPM/FT):	6.05

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	IRZ-25 (Upper)
Date -	10/7/2019
Screened Interval -	50'-67'
Injection Water Source -	Fresh water from construction water supply system
Injection Outlet Depth -	57' bgs
Depth to Packer -	71' bgs
Packer Leak Test (Pass/Fail) -	Pass
Water Level Prior to Injection -	46.20
Initial Totalizer Reading -	0
Final Totalizer Reading -	11079.9
Approx. Injection Volume (gal) -	11079.9
Calculated Injection Volume (gal) -	11104.92
Calculated and Totalizer Volume Difference (gal) -	25.02
Number of Injection Steps -	4
Injection Rates (List In Order) -	9.7, 18.5, 27.8, and 36.6 gpm

Notes - Flow rate fluctuated during step 1 due to refilling of fresh water tank for injectivity.

IM3 shut down at ~9:42 and restarted at ~10:52

Flow rate fluctuated during step 3 due to refilling of fresh water tank for injectivity.

Step 4						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 4 Start (Min)
14:30:20	360.33	37.06	6745.56	41.36	4.84	0.3
14:30:40	360.67	37.24	6757.98	41.21	4.99	0.7
14:31:00	361.00	36.59	6770.17	41.14	5.06	1.0
14:32:00	362.00	36.47	6806.64	41.03	5.17	2.0
14:33:00	363.00	36.67	6843.31	40.98	5.22	3.0
14:34:00	364.00	36.68	6879.99	40.95	5.25	4.0
14:35:00	365.00	36.68	6916.67	40.94	5.26	5.0
14:36:00	366.00	35.65	6952.32	40.93	5.27	6.0
14:37:00	367.00	36.56	6988.88	40.91	5.29	7.0
14:38:00	368.00	37.22	7026.10	40.89	5.31	8.0
14:39:00	369.00	36.19	7062.29	40.88	5.32	9.0
14:40:00	370.00	36.66	7098.95	40.88	5.32	10.0
14:42:00	372.00	36.94	7172.83	40.86	5.34	12.0
14:44:00	374.00	37.20	7247.23	40.86	5.34	14.0
14:46:00	376.00	36.42	7320.07	40.86	5.34	16.0
14:48:00	378.00	37.58	7395.23	40.86	5.34	18.0
14:50:00	380.00	37.60	7470.43	40.86	5.34	20.0
14:52:00	382.00	36.90	7544.23	40.85	5.35	22.0
14:54:00	384.00	36.94	7618.11	40.84	5.36	24.0
14:56:00	386.00	37.10	7692.31	40.83	5.37	26.0
14:58:00	388.00	36.73	7765.77	40.81	5.39	28.0
15:00:00	390.00	36.40	7838.57	40.81	5.39	30.0
15:05:00	395.00	36.28	8019.97	40.80	5.4	35.0
15:10:00	400.00	36.56	8202.77	40.79	5.41	40.0
15:15:00	405.00	36.70	8386.27	40.79	5.41	45.0
15:20:00	410.00	37.18	8572.17	40.78	5.42	50.0
15:25:00	415.00	36.78	8756.07	40.76	5.44	55.0
15:30:00	420.00	36.05	8936.32	40.78	5.42	60.0
15:40:00	430.00	36.26	9298.92	40.77	5.43	70.0
15:50:00	440.00	35.94	9658.32	40.76	5.44	80.0
16:00:00	450.00	36.21	10020.42	40.73	5.47	90.0
16:10:00	460.00	35.96	10380.02	40.71	5.49	100.0
16:20:00	470.00	36.02	10740.22	40.69	5.51	110.0
16:30:00	480.00	36.47	11104.92	40.69	5.51	120.0

Total Volume Injected During Step (GAL):	4371.71
Average Injection Rate (GPM):	36.64
Specific Injectivity (GPM/FT):	6.65

IRZ-25 Upper Screen (50-67 ft) Linear Change in Water Level Plot
Change in Water Level (feet)
Elapsed Time (min)
0
1
2
3
4
5
6
0
100
200
300
400
500
600
Legend
Transducer
Manual
Flow rate fluctuated due to refilling fresh water tank
IM3 shut down at 72 min and restarted at 142 min
Flow rate fluctuated due to refilling fresh water tank
Recovery Data
Step 1:
Step 1 Total Volume Injected: 1176.09 gal
Avg. Injection Rate: 9.68 gpm
Change in Water Level: 1.81 ft
Specific Injectivity: 5.35 gpm/ft
Step 2:
Step 2 Total Volume Injected: 2217.34 gal
Avg. Injection Rate: 18.53 gpm
Change in Water Level: 3.23 ft
Specific Injectivity: 5.74 gpm/ft
Step 3:
Step 3 Total Volume Injected: 3339.78 gal
Avg. Injection Rate: 27.78 gpm
Change in Water Level: 4.59 ft
Specific Injectivity: 6.05 gpm/ft
Step 4:
Step 4 Total Volume Injected: 4371.71 gal
Avg. Injection Rate: 36.64 gpm
Change in Water Level: 5.51 ft
Specific Injectivity: 6.65 gpm/ft

IRZ-25 Upper Screen (50-67 ft)
Semi-Log Change in Water Level Plot

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	**IRZ-25**
Date -	**9/21/2019**
Screened Interval Tested -	**Middle Screen (77-100 ft)**
Packer Set Depth -	**100-104 ft btoc**
Packer Seal Test -	Confirmed packer to be watertight before test
Tests Conducted -	4 step Specific Capacity Test (9, 18, 27, 36 GPM)
Purpose -	Well Performance Test
Summary -	Specific Capacity: 7.45-9.33 GPM/FT
Notes -	Inconsistent pumping rate at beginning of Step 1 and Step 2
	Pump was shut off at 16:49 just before collecting depth to water.
Oversight Signature -	
Date -	11/5/2019

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	IRZ-25 Middle
Date -	9/21/2019
Screened Interval -	77' - 100' bgs
Pump Depth (ft btoc) -	72
Packer Depth (ft btoc) -	100
Packer Leak Test (Pass/Fail) -	Pass
Initial Water Level Within 77' - 100' bgs -	45.66
Initial Water Level Within 50' - 67' bgs -	45.80
Initial Totalizer Reading (gal) -	0
Final Totalizer Reading (gal) -	11,062.50
Approx. Pumped Volume (gal) -	11,062.50
Calculated Volume Purged (gal) -	11,033.19
Differnce in volume Pumped vs. Calculated -	29.31
Number of Specific Capacity Steps -	4
Pumping Rates (List In Order) -	9, 18, 27, 36/max
Notes -	Pump was shut off at 16:49 just before collecting depth to water.
	-
	-

Step 1

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)
8:50:00	0.0	0.0	0.00	0.00	0.00	0
8:50:00	0.0	0.0	3.21	0.00	45.68	0.02
8:50:20	0.3	0.3	5.98	1.99	47.80	2.14
8:50:40	0.3	0.7	9.79	5.26	48.08	2.42
8:50:45	0.1	0.7	11.44	6.21	48.05	2.39
8:51:00	0.2	1.0	9.48	8.58	46.90	1.24
8:52:00	1.0	2.0	9.48	18.06	46.90	1.24
8:53:00	1.0	3.0	9.46	27.52	46.90	1.24
8:54:00	1.0	4.0	9.44	36.96	46.90	1.24
8:55:00	1.0	5.0	9.46	46.42	46.90	1.24
8:56:00	1.0	6.0	9.46	55.88	46.90	1.24
8:57:00	1.0	7.0	9.44	65.32	46.90	1.24
8:58:00	1.0	8.0	9.44	74.76	46.90	1.24
8:59:00	1.0	9.0	9.44	84.20	46.90	1.24
9:00:00	1.0	10.0	9.46	93.66	46.90	1.24
9:02:00	2.0	12.0	9.46	112.58	46.90	1.24
9:04:00	2.0	14.0	9.46	131.50	46.90	1.24
9:06:00	2.0	16.0	9.48	150.46	46.90	1.24
9:08:00	2.0	18.0	9.44	169.34	46.90	1.24
9:10:00	2.0	20.0	9.44	188.22	46.90	1.24
9:12:00	2.0	22.0	9.46	207.14	46.90	1.24
9:14:00	2.0	24.0	9.46	226.06	46.90	1.24
9:16:00	2.0	26.0	9.46	244.98	46.90	1.24
9:18:00	2.0	28.0	9.44	263.86	46.90	1.24
9:20:00	2.0	30.0	9.42	282.70	46.90	1.24
9:25:00	5.0	35.0	9.44	329.90	46.90	1.24
9:30:00	5.0	40.0	9.46	377.20	46.90	1.24
9:35:00	5.0	45.0	9.42	424.30	46.90	1.24
9:40:00	5.0	50.0	9.44	471.50	46.90	1.24
9:45:00	5.0	55.0	9.44	518.70	46.90	1.24
9:50:00	5.0	60.0	9.44	565.90	46.90	1.24
10:00:00	10.0	70.0	9.42	660.10	46.90	1.24
10:10:00	10.0	80.0	9.42	754.30	46.90	1.24
10:20:00	10.0	90.0	9.46	848.90	46.90	1.24
10:30:00	10.0	100.0	9.42	943.10	46.90	1.24
10:40:00	10.0	110.0	9.42	1037.30	46.90	1.24
10:50:00	10.0	120.0	9.42	1131.50	46.90	1.24

Total Volume Pumped for Step 1 (GAL):	1131.50
Average Pumping Rate (GPM):	9.24
Specific Capacity (GPM/FT):	7.45

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	IRZ-25 Middle
Date -	9/21/2019
Screened Interval -	77' - 100' bgs
Pump Depth (ft btoc) -	72
Packer Depth (ft btoc) -	100
Packer Leak Test (Pass/Fail) -	Pass
Initial Water Level Within 77' - 100' bgs -	45.66
Initial Water Level Within 50' - 67' bgs -	45.80
Initial Totalizer Reading (gal) -	0
Final Totalizer Reading (gal) -	11,062.50
Approx. Pumped Volume (gal) -	11,062.50
Calculated Volume Purged (gal) -	11,033.19
Differnce in volume Pumped vs. Calculated -	29.31
Number of Specific Capacity Steps -	4
Pumping Rates (List In Order) -	9, 18, 27, 36/max
Notes -	Pump was shut off at 16:49 just before collecting depth to water.
	-
	-

Step 2

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 2 Start (Min)
10:50:20	0.3	120.3	12.35	1041.42	47.30	1.64	0.3
10:50:40	0.3	120.7	21.94	1048.73	48.53	2.87	0.7
10:51:00	0.3	121.0	15.29	1053.83	47.60	1.94	1.0
10:52:00	1.0	122.0	18.22	1072.05	48.00	2.34	2.0
10:53:00	1.0	123.0	18.15	1090.20	48.00	2.34	3.0
10:54:00	1.0	124.0	18.23	1108.43	48.03	2.37	4.0
10:55:00	1.0	125.0	18.28	1126.71	48.03	2.37	5.0
10:56:00	1.0	126.0	18.23	1144.94	48.03	2.37	6.0
10:57:00	1.0	127.0	18.26	1163.20	48.03	2.37	7.0
10:58:00	1.0	128.0	18.38	1181.58	48.03	2.37	8.0
10:59:00	1.0	129.0	18.18	1199.76	48.04	2.38	9.0
11:00:00	1.0	130.0	18.28	1218.04	48.05	2.39	10.0
11:02:00	2.0	132.0	18.20	1254.44	48.05	2.39	12.0
11:04:00	2.0	134.0	18.24	1290.92	48.05	2.39	14.0
11:06:00	2.0	136.0	18.23	1327.38	48.05	2.39	16.0
11:08:00	2.0	138.0	18.23	1363.84	48.05	2.39	18.0
11:10:00	2.0	140.0	18.44	1400.72	48.05	2.39	20.0
11:12:00	2.0	142.0	18.33	1437.38	48.05	2.39	22.0
11:14:00	2.0	144.0	18.33	1474.04	48.05	2.39	24.0
11:16:00	2.0	146.0	18.32	1510.68	48.05	2.39	26.0
11:18:00	2.0	148.0	18.30	1547.28	48.05	2.39	28.0
11:20:00	2.0	150.0	18.28	1583.84	48.05	2.39	30.0
11:25:00	5.0	155.0	18.33	1675.49	48.05	2.39	35.0
11:30:00	5.0	160.0	18.33	1767.14	48.05	2.39	40.0
11:35:00	5.0	165.0	18.33	1858.79	48.05	2.39	45.0
11:40:00	5.0	170.0	18.34	1950.49	48.05	2.39	50.0
11:45:00	5.0	175.0	18.32	2042.09	48.05	2.39	55.0
11:50:00	5.0	180.0	18.38	2133.99	48.05	2.39	60.0
12:00:00	10.0	190.0	18.40	2317.99	48.06	2.40	70.0
12:10:00	10.0	200.0	18.32	2501.19	48.06	2.40	80.0
12:20:00	10.0	210.0	18.32	2684.39	48.06	2.40	90.0
12:30:00	10.0	220.0	18.40	2868.39	48.06	2.40	100.0
12:40:00	10.0	230.0	18.41	3052.49	48.06	2.40	110.0
12:50:00	10.0	240.0	18.40	3236.49	48.06	2.40	120.0

Total Volume Pumped for Step 2 (GAL):	2104.99
Average Pumping Rate (GPM):	18.15
Specific Capacity (GPM/FT):	7.56

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	IRZ-25 Middle
Date -	9/21/2019
Screened Interval -	77' - 100' bgs
Pump Depth (ft btoc) -	72
Packer Depth (ft btoc) -	100
Packer Leak Test (Pass/Fail) -	Pass
Initial Water Level Within 77' - 100' bgs -	45.66
Initial Water Level Within 50' - 67' bgs -	45.80
Initial Totalizer Reading (gal) -	0
Final Totalizer Reading (gal) -	11,062.50
Approx. Pumped Volume (gal) -	11,062.50
Calculated Volume Purged (gal) -	11,033.19
Differnce in volume Pumped vs. Calculated -	29.31
Number of Specific Capacity Steps -	4
Pumping Rates (List In Order) -	9, 18, 27, 36/max
Notes -	Pump was shut off at 16:49 just before collecting depth to water.
	-
	-

Step 3

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 3 Start (Min)
12:50:20	0.3	240.3	30.21	3246.56	48.92	3.26	0.3
12:50:40	0.3	240.7	28.14	3255.94	48.55	2.89	0.7
12:51:00	0.3	241.0	28.61	3265.47	48.80	3.14	1.0
12:52:00	1.0	242.0	26.98	3292.45	48.80	3.14	2.0
12:53:00	1.0	243.0	26.86	3319.31	48.80	3.14	3.0
12:54:00	1.0	244.0	26.75	3346.06	48.80	3.14	4.0
12:55:00	1.0	245.0	26.62	3372.68	48.80	3.14	5.0
12:56:00	1.0	246.0	26.88	3399.56	48.80	3.14	6.0
12:57:00	1.0	247.0	26.86	3426.42	48.80	3.14	7.0
12:58:00	1.0	248.0	26.74	3453.16	48.80	3.14	8.0
12:59:00	1.0	249.0	26.98	3480.14	48.80	3.14	9.0
13:00:00	1.0	250.0	27.00	3507.14	48.80	3.14	10.0
13:02:00	2.0	252.0	27.07	3561.28	48.80	3.14	12.0
13:04:00	2.0	254.0	26.94	3615.16	48.80	3.14	14.0
13:06:00	2.0	256.0	26.92	3669.00	48.80	3.14	16.0
13:08:00	2.0	258.0	26.94	3722.88	48.80	3.14	18.0
13:10:00	2.0	260.0	26.44	3775.76	48.80	3.14	20.0
13:12:00	2.0	262.0	26.20	3828.16	48.80	3.14	22.0
13:14:00	2.0	264.0	26.60	3881.36	48.80	3.14	24.0
13:16:00	2.0	266.0	26.68	3934.72	48.81	3.15	26.0
13:18:00	2.0	268.0	26.50	3987.72	48.82	3.16	28.0
13:20:00	2.0	270.0	26.84	4041.40	48.82	3.16	30.0
13:25:00	5.0	275.0	26.41	4173.45	48.82	3.16	35.0
13:30:00	5.0	280.0	26.54	4306.15	48.82	3.16	40.0
13:35:00	5.0	285.0	26.74	4439.85	48.83	3.17	45.0
13:40:00	5.0	290.0	26.54	4572.55	48.84	3.18	50.0
13:45:00	5.0	295.0	26.48	4704.95	48.84	3.18	55.0
13:50:00	5.0	300.0	26.76	4838.75	48.84	3.18	60.0
14:00:00	10.0	310.0	26.68	5105.55	48.85	3.19	70.0
14:10:00	10.0	320.0	26.51	5370.65	48.85	3.19	80.0
14:20:00	10.0	330.0	26.50	5635.65	48.85	3.19	90.0
14:30:00	10.0	340.0	26.68	5902.45	48.85	3.19	100.0
14:40:00	10.0	350.0	26.42	6166.65	48.86	3.20	110.0
14:50:00	10.0	360.0	26.50	6431.65	48.87	3.21	120.0

Total Volume Pumped for Step 3 (GAL):	3195.17
Average Pumping Rate (GPM):	26.90
Specific Capacity (GPM/FT):	8.38

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	IRZ-25 Middle
Date -	9/21/2019
Screened Interval -	77' - 100' bgs
Pump Depth (ft btoc) -	72
Packer Depth (ft btoc) -	100
Packer Leak Test (Pass/Fail) -	Pass
Initial Water Level Within 77' - 100' bgs -	45.66
Initial Water Level Within 50' - 67' bgs -	45.80
Initial Totalizer Reading (gal) -	0
Final Totalizer Reading (gal) -	11,062.50
Approx. Pumped Volume (gal) -	11,062.50
Calculated Volume Purged (gal) -	11,033.19
Differnce in volume Pumped vs. Calculated -	29.31
Number of Specific Capacity Steps -	4
Pumping Rates (List In Order) -	9, 18, 27, 36/max
Notes -	Pump was shut off at 16:49 just before collecting depth to water.
	-
	-

Step 4

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 4 Start (Min)
14:50:20	0.3	360.3	32.46	6442.47	49.28	3.62	0.3
14:50:40	0.3	360.7	31.86	6453.09	49.23	3.57	0.7
14:51:00	0.3	361.0	32.47	6463.92	49.23	3.57	1.0
14:52:00	1.0	362.0	39.71	6503.63	49.83	4.17	2.0
14:53:00	1.0	363.0	36.75	6540.38	49.42	3.76	3.0
14:54:00	1.0	364.0	36.60	6576.98	49.42	3.76	4.0
14:55:00	1.0	365.0	36.95	6613.93	49.42	3.76	5.0
14:56:00	1.0	366.0	37.34	6651.27	49.50	3.84	6.0
14:57:00	1.0	367.0	37.16	6688.43	49.52	3.86	7.0
14:58:00	1.0	368.0	37.40	6725.83	49.52	3.86	8.0
14:59:00	1.0	369.0	37.10	6762.93	49.53	3.87	9.0
15:00:00	1.0	370.0	36.95	6799.88	49.53	3.87	10.0
15:02:00	2.0	372.0	37.41	6874.70	49.53	3.87	12.0
15:04:00	2.0	374.0	37.05	6948.80	49.53	3.87	14.0
15:06:00	2.0	376.0	37.06	7022.92	49.53	3.87	16.0
15:08:00	2.0	378.0	37.41	7097.74	49.54	3.88	18.0
15:10:00	2.0	380.0	37.08	7171.90	49.54	3.88	20.0
15:12:00	2.0	382.0	37.86	7247.62	49.54	3.88	22.0
15:14:00	2.0	384.0	37.20	7322.02	49.54	3.88	24.0
15:16:00	2.0	386.0	37.10	7396.22	49.55	3.89	26.0
15:18:00	2.0	388.0	37.28	7470.78	49.55	3.89	28.0
15:20:00	2.0	390.0	37.03	7544.84	49.55	3.89	30.0
15:25:00	5.0	395.0	37.28	7731.24	49.55	3.89	35.0
15:30:00	5.0	400.0	37.33	7917.89	49.58	3.92	40.0
15:35:00	5.0	405.0	37.44	8105.09	49.58	3.92	45.0
15:40:00	5.0	410.0	37.60	8293.09	49.59	3.93	50.0
15:45:00	5.0	415.0	37.20	8479.09	49.59	3.93	55.0
15:50:00	5.0	420.0	37.36	8665.89	49.59	3.93	60.0
16:00:00	10.0	430.0	37.18	9037.69	49.60	3.94	70.0
16:10:00	10.0	440.0	37.57	9413.39	49.60	3.94	80.0
16:20:00	10.0	450.0	37.64	9789.79	49.60	3.94	90.0
16:30:00	10.0	460.0	38.46	10174.39	49.61	3.95	100.0
16:40:00	10.0	470.0	37.68	10551.19	49.62	3.96	110.0
16:50:00	10.0	480.0	38.78	10938.99	46.30	0.64	120.0
16:51:00	1.0	481.0	0.00	10938.99	46.10	0.44	121.0
16:52:00	1.0	482.0	0.00	10938.99	45.97	0.31	122.0
16:53:00	1.0	483.0	0.00	10938.99	45.95	0.29	123.0
16:54:00	1.0	484.0	0.00	10938.99	45.92	0.26	124.0
16:55:00	1.0	485.0	0.00	10938.99	45.90	0.24	125.0
16:56:00	1.0	486.0	0.00	10938.99	45.90	0.24	126.0
16:57:00	1.0	487.0	0.00	10938.99	45.89	0.23	127.0
16:58:00	1.0	488.0	0.00	10938.99	45.89	0.23	128.0

Total Volume Pumped for Step 4 (GAL):	4507.33
Average Pumping Rate (GPM):	36.96
Specific Capacity (GPM/FT):	9.33

IRZ-25 Middle Screen (77-100 ft) Linear Drawdown Plot
Step 1:
Step 1 Total Volume Pumped: 1131.50 gal
Avg. Flow Rate: 9.24 gpm
Drawdown: 1.24 ft
Specific Capacity: 7.45 gpm/ft
Step 2:
Step 2 Total Volume Pumped: 2104.99 gal
Avg. Flow Rate: 18.15 gpm
Drawdown: 2.40 ft
Specific Capacity: 7.56 gpm/ft
Step 3:
Step 3 Total Volume Pumped: 3195.17 gal
Avg. Flow Rate: 26.90 gpm
Drawdown: 3.21 ft
Specific Capacity: 8.38 gpm/ft
Step 4:
Step 4 Total Volume Pumped: 4507.33 gal
Avg. Flow Rate: 36.96 gpm
Drawdown: 3.96 ft
Specific Capacity: 9.33 gpm/ft
Recovery Data
Inconsistent Pumping Rate
Legend
Transducer
Manual
Drawdown (feet)
Elapsed Time (min)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
0
100
200
300
400
500
600
700

IRZ-25 Middle Screen (77-100 ft)
Semi-Log Drawdown Plot

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	**IRZ-25**
Date -	**10/5/2019**
Screened Interval Tested -	**Middle Screen (77-100 ft)**
Packer Set Depth -	**71' bgs and 106' bgs**
Packer Seal Test -	Confirmed packer to be watertight before test
Tests Conducted -	4 step Injectivity Test (9.8, 18.8, 27.7, 37.4 gpm)
Purpose -	Well Performance Test
Summary -	Specific Injectivity: 10.15-12.91 GPM/FT
Notes -	
	Flow rate fluctuated during step 2 due to refilling of fresh water tank for injectivity.
	Flow rate fluctuated during step 3 due to refilling of fresh water tank for injectivity.
	Flow rate fluctuated during step 4 due to refilling of fresh water tank for injectivity.
	Unexpected flow rate increase at ~15:20
	Inconsistant flow rate at start of step 4.
	Possible transducer data drift during step 2.
Oversight Signature -	
Date -	11/5/2019

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	IRZ-25 (Middle)
Date -	10/5/2019
Screened Interval -	77'-100'
Injection Water Source -	Fresh water from construction water supply system
Injection Outlet Depth -	88.5' bgs
Depth to Packer -	71' bgs and 106' bgs
Packer Leak Test (Pass/Fail) -	Pass
Water Level Prior to Injection -	46.45
Initial Totalizer Reading (gal) -	0
Final Totalizer Reading (gal)-	11434.8
Approx. Injection Volume (gal) -	11434.8
Calculated Volume Purged (gal) -	11317.99
(gal) -	116.81
Number of Injection Steps -	4
Injection Rates (List In Order) -	9.8, 18.8, 27.7, 37.4 gpm

Notes - Flow rate fluctuated during step 2 due to refilling of fresh water tank for injectivity.
Flow rate fluctuated during step 3 due to refilling of fresh water tank for injectivity.
Flow rate fluctuated during step 4 due to refilling of fresh water tank for injectivity.
Unexpected flow rate increase at ~15:20
Inconsistant flow rate at start of step 4.

Step 1

Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)
8:30:00	0	0.00	0	46.45	0
8:30:20	0.33	9.96	3.32	45.79	0.66
8:30:40	0.67	8.78	6.25	45.74	0.71
8:31:00	1.00	9.86	9.53	45.63	0.82
8:32:00	2.00	9.82	19.35	45.60	0.85
8:33:00	3.00	9.82	29.17	45.58	0.87
8:34:00	4.00	9.74	38.91	45.58	0.87
8:35:00	5.00	9.72	48.63	45.60	0.85
8:36:00	6.00	9.84	58.47	45.55	0.9
8:37:00	7.00	9.80	68.27	45.57	0.88
8:38:00	8.00	9.84	78.11	45.50	0.95
8:39:00	9.00	9.86	87.97	45.53	0.92
8:40:00	10.00	9.86	97.83	45.53	0.92
8:42:00	12.00	9.82	117.47	45.57	0.88
8:44:00	14.00	9.84	137.15	45.57	0.88
8:46:00	16.00	9.82	156.79	45.57	0.88
8:48:00	18.00	9.82	176.43	45.57	0.88
8:50:00	20.00	9.89	196.21	45.57	0.88
8:52:00	22.00	9.86	215.93	45.57	0.88
8:54:00	24.00	9.89	235.71	45.60	0.85
8:56:00	26.00	9.92	255.55	45.55	0.9
8:58:00	28.00	9.84	275.23	45.50	0.95
9:00:00	30.00	9.84	294.91	45.58	0.87
9:05:00	35.00	9.89	344.36	45.58	0.87
9:10:00	40.00	9.92	393.96	45.56	0.89
9:15:00	45.00	9.86	443.26	45.55	0.9
9:20:00	50.00	9.86	492.56	45.55	0.9
9:25:00	55.00	9.84	541.76	45.55	0.9
9:30:00	60.00	9.84	590.96	45.52	0.93
9:40:00	70.00	9.82	689.16	45.53	0.92
9:50:00	80.00	9.77	786.86	45.53	0.92
10:00:00	90.00	9.72	884.06	45.55	0.9
10:10:00	100.00	9.77	981.76	45.55	0.9
10:20:00	110.00	9.77	1079.46	45.52	0.93
10:30:00	120.00	9.77	1177.16	45.60	0.85

Total Volume Injected During Step (GAL):	1177.16
Average Injection Rate (GPM):	9.80
Specific Injectivity (GPM/FT):	11.53

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	IRZ-25 (Middle)
Date -	10/5/2019
Screened Interval -	77'-100'
Injection Water Source -	Fresh water from construction water supply system
Injection Outlet Depth -	88.5' bgs
Depth to Packer -	71' bgs and 106' bgs
Packer Leak Test (Pass/Fail) -	Pass
Water Level Prior to Injection -	46.45
Initial Totalizer Reading (gal) -	0
Final Totalizer Reading (gal)-	11434.8
Approx. Injection Volume (gal) -	11434.8
Calculated Volume Purged (gal) -	11317.99
(gal) -	116.81
Number of Injection Steps -	4
Injection Rates (List In Order) -	9.8, 18.8, 27.7, 37.4 gpm

Notes - Flow rate fluctuated during step 2 due to refilling of fresh water tank for injectivity.
Flow rate fluctuated during step 3 due to refilling of fresh water tank for injectivity.
Flow rate fluctuated during step 4 due to refilling of fresh water tank for injectivity.
Unexpected flow rate increase at ~15:20
Inconsistant flow rate at start of step 4.

Step 2						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 2 Start (Min)
10:30:20	120.33	17.78	1183.09	44.99	1.46	0.3
10:30:40	120.67	18.38	1189.22	44.80	1.65	0.7
10:31:00	121.00	18.82	1195.49	44.78	1.67	1.0
10:32:00	122.00	18.71	1214.20	44.71	1.74	2.0
10:33:00	123.00	18.70	1232.90	44.71	1.74	3.0
10:34:00	124.00	18.80	1251.70	44.71	1.74	4.0
10:35:00	125.00	18.84	1270.54	44.71	1.74	5.0
10:36:00	126.00	18.78	1289.32	44.71	1.74	6.0
10:37:00	127.00	18.69	1308.01	44.71	1.74	7.0
10:38:00	128.00	18.76	1326.77	44.71	1.74	8.0
10:39:00	129.00	18.76	1345.53	44.71	1.74	9.0
10:40:00	130.00	18.73	1364.26	44.71	1.74	10.0
10:42:00	132.00	18.80	1401.86	44.70	1.75	12.0
10:44:00	134.00	18.69	1439.24	44.70	1.75	14.0
10:46:00	136.00	18.66	1476.56	44.70	1.75	16.0
10:48:00	138.00	18.73	1514.02	44.70	1.75	18.0
10:50:00	140.00	18.86	1551.74	44.70	1.75	20.0
10:52:00	142.00	18.89	1589.52	44.69	1.76	22.0
10:54:00	144.00	18.89	1627.30	44.68	1.77	24.0
10:56:00	146.00	18.82	1664.94	44.68	1.77	26.0
10:58:00	148.00	18.76	1702.46	44.68	1.77	28.0
11:00:00	150.00	18.80	1740.06	44.68	1.77	30.0
11:05:00	155.00	18.84	1834.26	44.67	1.78	35.0
11:10:00	160.00	18.71	1927.81	44.65	1.8	40.0
11:15:00	165.00	18.64	2021.01	44.65	1.8	45.0
11:20:00	170.00	18.89	2115.46	44.65	1.8	50.0
11:25:00	175.00	18.71	2209.01	44.65	1.8	55.0
11:30:00	180.00	18.84	2303.21	44.65	1.8	60.0
11:40:00	190.00	18.82	2491.41	44.64	1.81	70.0
11:50:00	200.00	18.87	2680.11	44.63	1.82	80.0
12:00:00	210.00	18.82	2868.31	44.62	1.83	90.0
12:10:00	220.00	18.71	3055.41	44.61	1.84	100.0
12:20:00	230.00	18.76	3243.01	44.60	1.85	110.0
12:30:00	240.00	20.38	3446.81	44.60	1.85	120.0

Total Volume Injected During Step (GAL):	2269.65
Average Injection Rate (GPM):	18.78
Specific Injectivity (GPM/FT):	10.15

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	IRZ-25 (Middle)
Date -	10/5/2019
Screened Interval -	77'-100'
Injection Water Source -	Fresh water from construction water supply system
Injection Outlet Depth -	88.5' bgs
Depth to Packer -	71' bgs and 106' bgs
Packer Leak Test (Pass/Fail) -	Pass
Water Level Prior to Injection -	46.45
Initial Totalizer Reading (gal) -	0
Final Totalizer Reading (gal)-	11434.8
Approx. Injection Volume (gal) -	11434.8
Calculated Volume Purged (gal) -	11317.99
(gal) -	116.81
Number of Injection Steps -	4
Injection Rates (List In Order) -	9.8, 18.8, 27.7, 37.4 gpm

Notes - Flow rate fluctuated during step 2 due to refilling of fresh water tank for injectivity.
Flow rate fluctuated during step 3 due to refilling of fresh water tank for injectivity.
Flow rate fluctuated during step 4 due to refilling of fresh water tank for injectivity.
Unexpected flow rate increase at ~15:20
Inconsistant flow rate at start of step 4.

Step 3						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 3 Start (Min)
12:30:20	240.33	26.94	3455.79	44.09	2.36	0.3
12:30:40	240.67	27.53	3464.97	43.98	2.47	0.7
12:31:00	241.00	29.50	3474.80	43.95	2.5	1.0
12:32:00	242.00	26.14	3500.94	44.05	2.4	2.0
12:33:00	243.00	27.72	3528.66	44.00	2.45	3.0
12:34:00	244.00	29.01	3557.67	43.98	2.47	4.0
12:35:00	245.00	27.93	3585.60	43.98	2.47	5.0
12:36:00	246.00	27.70	3613.30	44.00	2.45	6.0
12:37:00	247.00	27.58	3640.88	44.02	2.43	7.0
12:38:00	248.00	27.34	3668.22	44.02	2.43	8.0
12:39:00	249.00	27.56	3695.78	44.02	2.43	9.0
12:40:00	250.00	27.79	3723.57	44.02	2.43	10.0
12:42:00	252.00	27.86	3779.29	44.02	2.43	12.0
12:44:00	254.00	27.88	3835.05	44.02	2.43	14.0
12:46:00	256.00	27.60	3890.25	44.02	2.43	16.0
12:48:00	258.00	27.53	3945.31	44.02	2.43	18.0
12:50:00	260.00	27.98	4001.27	44.02	2.43	20.0
12:52:00	262.00	27.56	4056.39	44.02	2.43	22.0
12:54:00	264.00	27.39	4111.17	44.02	2.43	24.0
12:56:00	266.00	27.79	4166.75	44.02	2.43	26.0
12:58:00	268.00	27.82	4222.39	44.01	2.44	28.0
13:00:00	270.00	28.19	4278.77	44.01	2.44	30.0
13:05:00	275.00	27.60	4416.77	44.02	2.43	35.0
13:10:00	280.00	27.98	4556.67	44.00	2.45	40.0
13:15:00	285.00	28.00	4696.67	44.00	2.45	45.0
13:20:00	290.00	27.67	4835.02	44.00	2.45	50.0
13:25:00	295.00	27.67	4973.37	44.00	2.45	55.0
13:30:00	300.00	27.06	5108.67	44.00	2.45	60.0
13:40:00	310.00	26.17	5370.37	44.00	2.45	70.0
13:50:00	320.00	27.88	5649.17	44.00	2.45	80.0
14:00:00	330.00	27.82	5927.37	44.00	2.45	90.0
14:10:00	340.00	27.82	6205.57	43.98	2.47	100.0
14:20:00	350.00	26.76	6473.17	43.98	2.47	110.0
14:30:00	360.00	28.20	6755.17	43.99	2.46	120.0

Total Volume Injected During Step (GAL):	3308.36
Average Injection Rate (GPM):	27.68
Specific Injectivity (GPM/FT):	11.25

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	IRZ-25 (Middle)
Date -	10/5/2019
Screened Interval -	77'-100'
Injection Water Source -	Fresh water from construction water supply system
Injection Outlet Depth -	88.5' bgs
Depth to Packer -	71' bgs and 106' bgs
Packer Leak Test (Pass/Fail) -	Pass
Water Level Prior to Injection -	46.45
Initial Totalizer Reading (gal) -	0
Final Totalizer Reading (gal)-	11434.8
Approx. Injection Volume (gal) -	11434.8
Calculated Volume Purged (gal) -	11317.99
(gal) -	116.81
Number of Injection Steps -	4
Injection Rates (List In Order) -	9.8, 18.8, 27.7, 37.4 gpm

Notes - Flow rate fluctuated during step 2 due to refilling of fresh water tank for injectivity.
Flow rate fluctuated during step 3 due to refilling of fresh water tank for injectivity.
Flow rate fluctuated during step 4 due to refilling of fresh water tank for injectivity.
Unexpected flow rate increase at ~15:20
Inconsistant flow rate at start of step 4.

Step 4						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 4 Start (Min)
14:30:20	360.33	39.97	6768.49	43.47	2.98	0.3
14:30:40	360.67	36.31	6780.60	43.60	2.85	0.7
14:31:00	361.00	36.96	6792.92	43.55	2.9	1.0
14:32:00	362.00	34.08	6827.00	43.55	2.9	2.0
14:33:00	363.00	37.88	6864.88	43.57	2.88	3.0
14:34:00	364.00	36.66	6901.54	43.57	2.88	4.0
14:35:00	365.00	36.64	6938.18	43.45	3	5.0
14:36:00	366.00	37.01	6975.19	43.45	3	6.0
14:37:00	367.00	33.80	7008.99	43.52	2.93	7.0
14:38:00	368.00	37.27	7046.26	43.52	2.93	8.0
14:39:00	369.00	39.26	7085.52	43.52	2.93	9.0
14:40:00	370.00	38.04	7123.56	43.52	2.93	10.0
14:42:00	372.00	37.72	7199.00	43.52	2.93	12.0
14:44:00	374.00	36.50	7272.00	43.52	2.93	14.0
14:46:00	376.00	37.24	7346.48	43.52	2.93	16.0
14:48:00	378.00	35.37	7417.22	43.52	2.93	18.0
14:50:00	380.00	35.25	7487.72	43.52	2.93	20.0
14:52:00	382.00	36.56	7560.84	43.52	2.93	22.0
14:54:00	384.00	36.36	7633.56	43.52	2.93	24.0
14:56:00	386.00	35.04	7703.64	43.52	2.93	26.0
14:58:00	388.00	38.07	7779.78	43.52	2.93	28.0
15:00:00	390.00	37.08	7853.94	43.52	2.93	30.0
15:05:00	395.00	37.90	8043.44	43.52	2.93	35.0
15:10:00	400.00	36.31	8224.99	43.52	2.93	40.0
15:15:00	405.00	36.19	8405.94	43.52	2.93	45.0
15:20:00	410.00	40.27	8607.29	43.52	2.93	50.0
15:25:00	415.00	42.66	8820.59	43.55	2.9	55.0
15:30:00	420.00	42.46	9032.89	43.55	2.9	60.0
15:40:00	430.00	38.63	9419.19	43.55	2.9	70.0
15:50:00	440.00	38.60	9805.19	43.55	2.9	80.0
16:00:00	450.00	38.66	10191.79	43.55	2.9	90.0
16:10:00	460.00	37.72	10568.99	43.55	2.9	100.0
16:20:00	470.00	38.00	10948.99	43.55	2.9	110.0
16:30:00	480.00	36.90	11317.99	43.55	2.9	120.0

Total Volume Injected During Step (GAL):	4562.82
Average Injection Rate (GPM):	37.45
Specific Injectivity (GPM/FT):	12.91

IRZ-25 Middle Screen (77-100 ft) Linear Change in Water Level Plot
Change in Water Level (feet)
Elapsed Time (min)
0
1
1
2
2
3
3
4
0
50
100
150
200
250
300
350
400
450
500
Inconsistent flow rate at start of step 4
Unexpected flow rate increase
Flow rate fluctuated due to refilling fresh water tank
Flow rate fluctuated due to refilling fresh water tank
Step 4:
Step 4 Total Volume Injected: 4562.82 gal
Avg. Injection Rate: 37.45 gpm
Change in Water Level: 2.9 ft
Specific Injectivity: 12.91 gpm/ft
Step 2:
Step 2 Total Volume Injected: 2269.65 gal
Avg. Injection Rate: 18.78 gpm
Change in Water Level: 1.85 ft
Specific Injectivity: 10.15 gpm/ft
Step 3:
Step 3 Total Volume Injected: 3308.36 gal
Avg. Injection Rate: 27.68 gpm
Change in Water Level: 2.46 ft
Specific Injectivity: 11.25 gpm/ft
Possible transducer data drift
Flow rate fluctuated due to refilling fresh water tank
Legend
Transducer
Manual
Step 1:
Step 1 Total Volume Injected: 1177.16 gal
Avg. Injection Rate: 9.80 gpm
Change in Water Level: 0.85 ft
Specific Injectivity: 11.53 gpm/ft
Recovery Data

IRZ-25 Middle Screen (77-100 ft)
Semi-Log Change in Water Level Plot

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	**IRZ-25**
Date -	**10/3/2019**
Screened Interval Tested -	**Lower Screen (135-166 ft)**
Packer Set Depth -	**127' - 130' bgs**
Packer Seal Test -	Confirmed packer to be watertight before test
Tests Conducted -	4 step Injectivity Test (9, 18, 27, 36 GPM Respectfully)
Purpose -	Well Performance Test
Summary -	Specific Injectivity: 1.79-2.09 GPM/FT
Notes -	Injection well transducer was inadvertently not programed during step 1.
	Flow rates fluctuated during steps 2, 3, and 4 due to refilling of fresh water tank for injectivity.
Oversight Signature -	
Date -	1/3/2020

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	IRZ-25 (Lower)
Date -	10/3/2019
Screened Interval -	135'-166' bgs
Injection Water Source -	Fresh Water
Injection Outlet Depth -	145'
Depth to Packer -	127'
Packer Leak Test (Pass/Fail) -	Pass
Water Level Prior to Injection (ft btoc) -	46.47
Initial Totalizer Reading -	0
Final Totalizer Reading -	11219.3
Approx. Injection Volume (gal) -	11219.3
Calculated Volume Purged (gal) -	11374.36
Calculated and Totalizer Volume Difference (gal) -	155.06
Number of Injection Steps -	4
Injection Rates (List In Order) -	9, 18, 27, 36 GPM Repectfully

Step 1					
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)
8:30:00	0.00	0.00	0.00	46.47	0.00
8:30:20	0.33	7.68	2.56	45.73	0.74
8:30:40	0.67	8.64	5.44	44.90	1.57
8:31:00	1.00	8.66	8.33	43.65	2.82
8:32:00	2.00	9.56	17.89	42.38	4.09
8:33:00	3.00	9.52	27.41	41.70	4.77
8:34:00	4.00	9.49	36.90	41.50	4.97
8:35:00	5.00	9.49	46.39	41.45	5.02
8:36:00	6.00	9.46	55.85	41.50	4.97
8:37:00	7.00	9.46	65.31	41.40	5.07
8:38:00	8.00	9.46	74.77	41.50	4.97
8:39:00	9.00	9.44	84.21	41.30	5.17
8:40:00	10.00	9.44	93.65	41.30	5.17
8:42:00	12.00	9.44	112.53	41.35	5.12
8:44:00	14.00	9.49	131.51	41.45	5.02
8:46:00	16.00	9.42	150.35	41.35	5.12
8:48:00	18.00	9.42	169.19	41.47	5.00
8:50:00	20.00	9.42	188.03	41.32	5.15
8:52:00	22.00	9.37	206.77	41.22	5.25
8:54:00	24.00	9.37	225.51	41.30	5.17
8:56:00	26.00	9.40	244.31	41.25	5.22
8:58:00	28.00	9.42	263.15	41.30	5.17
9:00:00	30.00	9.38	281.91	41.33	5.14
9:05:00	35.00	9.37	328.76	41.45	5.02
9:10:00	40.00	9.42	375.86	41.45	5.02
9:15:00	45.00	9.34	422.56	41.58	4.89
9:20:00	50.00	9.37	469.41	41.35	5.12
9:25:00	55.00	9.37	516.26	41.32	5.15
9:30:00	60.00	9.40	563.26	41.40	5.07
9:40:00	70.00	9.40	657.26	41.25	5.22
9:50:00	80.00	9.32	750.46	41.33	5.14
10:00:00	90.00	9.40	844.46	41.41	5.06
10:10:00	100.00	9.40	938.46	41.25	5.22
10:20:00	110.00	9.37	1032.16	41.40	5.07
10:30:00	120.00	9.34	1125.56	41.45	5.02
10:40:00	130.00	9.44	1219.96	41.25	5.22

Total Volume Injected During Step (GAL):	1219.96
Average Injection Rate (GPM):	9.32
Specific Injectivity (GPM/FT):	1.79

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	IRZ-25 (Lower)
Date -	10/3/2019
Screened Interval -	135'-166' bgs
Injection Water Source -	Fresh Water
Injection Outlet Depth -	145'
Depth to Packer -	127'
Packer Leak Test (Pass/Fail) -	Pass
Water Level Prior to Injection (ft btoc) -	46.47
Initial Totalizer Reading -	0
Final Totalizer Reading -	11219.3
Approx. Injection Volume (gal) -	11219.3
Calculated Volume Purged (gal) -	11374.36
Calculated and Totalizer Volume Difference (gal) -	155.06
Number of Injection Steps -	4
Injection Rates (List In Order) -	9, 18, 27, 36 GPM Repectfully

Step 2						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 2 Start (Min)
10:40:20	130.33	17.73	1225.87	39.38	7.09	0.00
10:40:40	130.67	18.50	1232.03	38.30	8.17	0.33
10:41:00	131.00	18.52	1238.21	37.71	8.76	0.67
10:42:00	132.00	18.55	1256.76	37.05	9.42	1.67
10:43:00	133.00	18.64	1275.40	36.75	9.72	2.67
10:44:00	134.00	18.58	1293.98	36.60	9.87	3.67
10:45:00	135.00	18.66	1312.64	36.55	9.92	4.67
10:46:00	136.00	18.64	1331.28	36.50	9.97	5.67
10:47:00	137.00	18.62	1349.90	36.46	10.01	6.67
10:48:00	138.00	18.64	1368.54	36.45	10.02	7.67
10:49:00	139.00	18.67	1387.21	36.45	10.02	8.67
10:50:00	140.00	18.62	1405.83	36.43	10.04	9.67
10:52:00	142.00	18.71	1443.25	36.40	10.07	11.67
10:54:00	144.00	18.74	1480.73	36.37	10.10	13.67
10:56:00	146.00	18.67	1518.07	36.37	10.10	15.67
10:58:00	148.00	18.71	1555.49	36.37	10.10	17.67
11:00:00	150.00	18.80	1593.09	36.35	10.12	19.67
11:02:00	152.00	18.74	1630.57	36.35	10.12	21.67
11:04:00	154.00	18.82	1668.21	36.35	10.12	23.67
11:06:00	156.00	18.72	1705.65	36.32	10.15	25.67
11:08:00	158.00	18.71	1743.07	36.32	10.15	27.67
11:10:00	160.00	18.80	1780.67	36.30	10.17	29.67
11:15:00	165.00	18.71	1874.22	36.34	10.13	34.67
11:20:00	170.00	18.76	1968.02	36.30	10.17	39.67
11:25:00	175.00	18.78	2061.92	36.30	10.17	44.67
11:30:00	180.00	18.76	2155.72	36.30	10.17	49.67
11:35:00	185.00	18.82	2249.82	36.28	10.19	54.67
11:40:00	190.00	18.85	2344.07	36.28	10.19	59.67
11:50:00	200.00	19.98	2543.87	36.20	10.27	69.67
12:00:00	210.00	19.30	2736.87	36.05	10.42	79.67
12:10:00	220.00	19.27	2929.57	35.97	10.50	89.67
12:20:00	230.00	19.52	3124.77	35.92	10.55	99.67
12:30:00	240.00	19.42	3318.97	35.93	10.54	109.67
12:40:00	250.00	22.96	3548.57	35.93	10.54	119.67

Total Volume Injected During Step (GAL):	2328.61
Average Injection Rate (GPM):	18.91
Specific Injectivity (GPM/FT):	1.79

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	IRZ-25 (Lower)
Date -	10/3/2019
Screened Interval -	135'-166' bgs
Injection Water Source -	Fresh Water
Injection Outlet Depth -	145'
Depth to Packer -	127'
Packer Leak Test (Pass/Fail) -	Pass
Water Level Prior to Injection (ft btoc) -	46.47
Initial Totalizer Reading -	0
Final Totalizer Reading -	11219.3
Approx. Injection Volume (gal) -	11219.3
Calculated Volume Purged (gal) -	11374.36
Calculated and Totalizer Volume Difference (gal) -	155.06
Number of Injection Steps -	4
Injection Rates (List In Order) -	9, 18, 27, 36 GPM Repectfully

Step 3						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 3 Start (Min)
12:40:20	250.33	27.60	3557.77	33.90	12.57	0.00
12:40:40	250.67	27.36	3566.89	33.49	12.98	0.33
12:41:00	251.00	27.65	3576.10	33.00	13.47	0.67
12:42:00	252.00	27.67	3603.77	32.55	13.92	1.67
12:43:00	253.00	28.42	3632.19	32.28	14.19	2.67
12:44:00	254.00	27.51	3659.70	32.30	14.17	3.67
12:45:00	255.00	27.56	3687.26	32.30	14.17	4.67
12:46:00	256.00	27.84	3715.10	32.27	14.20	5.67
12:47:00	257.00	27.60	3742.70	32.22	14.25	6.67
12:48:00	258.00	27.53	3770.23	32.20	14.27	7.67
12:49:00	259.00	27.74	3797.97	32.20	14.27	8.67
12:50:00	260.00	27.42	3825.39	32.20	14.27	9.67
12:52:00	262.00	27.88	3881.15	32.20	14.27	11.67
12:54:00	264.00	27.51	3936.17	32.18	14.29	13.67
12:56:00	266.00	27.65	3991.47	32.18	14.29	15.67
12:58:00	268.00	27.53	4046.53	32.18	14.29	17.67
13:00:00	270.00	28.14	4102.81	32.18	14.29	19.67
13:02:00	272.00	27.72	4158.25	32.18	14.29	21.67
13:04:00	274.00	27.30	4212.85	32.18	14.29	23.67
13:06:00	276.00	27.58	4268.01	32.18	14.29	25.67
13:08:00	278.00	27.28	4322.57	32.18	14.29	27.67
13:10:00	280.00	27.13	4376.83	32.18	14.29	29.67
13:15:00	285.00	27.60	4514.83	32.15	14.32	34.67
13:20:00	290.00	27.84	4654.03	32.12	14.35	39.67
13:25:00	295.00	28.00	4794.03	32.08	14.39	44.67
13:30:00	300.00	27.93	4933.68	32.08	14.39	49.67
13:35:00	305.00	27.56	5071.48	32.08	14.39	54.67
13:40:00	310.00	27.88	5210.88	32.08	14.39	59.67
13:50:00	320.00	28.10	5491.88	32.10	14.37	69.67
14:00:00	330.00	27.93	5771.18	32.10	14.37	79.67
14:10:00	340.00	27.76	6048.78	32.13	14.34	89.67
14:20:00	350.00	28.19	6330.68	32.15	14.32	99.67
14:30:00	360.00	28.14	6612.08	32.15	14.32	109.67

Total Volume Injected During Step (GAL):	3063.52
Average Injection Rate (GPM):	27.71
Specific Injectivity (GPM/FT):	1.94

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	**IRZ-25 (Lower)**
Date -	**10/3/2019**
Screened Interval -	**135'-166' bgs**
Injection Water Source -	**Fresh Water**
Injection Outlet Depth -	**145'**
Depth to Packer -	**127'**
Packer Leak Test (Pass/Fail) -	**Pass**
Water Level Prior to Injection (ft btoc) -	**46.47**
Initial Totalizer Reading -	**0**
Final Totalizer Reading -	**11219.3**
Approx. Injection Volume (gal) -	**11219.3**
Calculated Volume Purged (gal) -	**11374.36**
Calculated and Totalizer Volume Difference (gal) -	**155.06**
Number of Injection Steps -	**4**
Injection Rates (List In Order) -	**9, 18, 27, 36 GPM Repectfully**

Step 4						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 4 Start (Min)
14:40:00	370.00	39.38	7005.88	32.15	14.32	0.00
14:40:20	370.33	39.10	7018.92	30.27	16.20	0.33
14:40:40	370.67	36.52	7031.09	30.05	16.42	0.67
14:41:00	371.00	36.31	7043.19	29.80	16.67	1.00
14:42:00	372.00	37.69	7080.88	29.30	17.17	2.00
14:43:00	373.00	37.10	7117.98	29.10	17.37	3.00
14:44:00	374.00	36.10	7154.08	29.00	17.47	4.00
14:45:00	375.00	37.10	7191.18	28.95	17.52	5.00
14:46:00	376.00	37.62	7228.80	28.93	17.54	6.00
14:47:00	377.00	38.14	7266.94	28.90	17.57	7.00
14:48:00	378.00	35.46	7302.40	28.97	17.50	8.00
14:49:00	379.00	36.54	7338.94	28.97	17.50	9.00
14:50:00	380.00	36.80	7375.74	28.97	17.50	10.00
14:52:00	382.00	36.12	7447.98	28.95	17.52	12.00
14:54:00	384.00	36.82	7521.62	28.95	17.52	14.00
14:56:00	386.00	36.45	7594.52	28.95	17.52	16.00
14:58:00	388.00	36.45	7667.42	28.92	17.55	18.00
15:00:00	390.00	35.98	7739.38	28.90	17.57	20.00
15:02:00	392.00	37.08	7813.54	28.90	17.57	22.00
15:04:00	394.00	36.94	7887.42	28.90	17.57	24.00
15:06:00	396.00	36.62	7960.66	28.86	17.61	26.00
15:08:00	398.00	36.92	8034.50	28.87	17.60	28.00
15:10:00	400.00	37.08	8108.66	28.87	17.60	30.00
15:15:00	405.00	36.66	8291.96	28.84	17.63	35.00
15:20:00	410.00	36.80	8475.96	28.82	17.65	40.00
15:25:00	415.00	37.16	8661.76	28.80	17.67	45.00
15:30:00	420.00	36.64	8844.96	28.78	17.69	50.00
15:35:00	425.00	36.87	9029.31	28.75	17.72	55.00
15:40:00	430.00	36.45	9211.56	28.75	17.72	60.00
15:50:00	440.00	36.68	9578.36	28.78	17.69	70.00
16:00:00	450.00	36.08	9939.16	28.80	17.67	80.00
16:10:00	460.00	35.88	10297.96	28.80	17.67	90.00
16:20:00	470.00	36.02	10658.16	28.80	17.67	100.00
16:30:00	480.00	36.14	11019.56	28.80	17.67	110.00
16:40:00	490.00	35.48	11374.36	28.85	17.62	120.00

Total Volume Injected During Step (GAL):	4762.28
Average Injection Rate (GPM):	36.78
Specific Injectivity (GPM/FT):	2.09

IRZ-25 Lower Screen (135-166 ft) Linear Change in Water Level Plot
Flow rates fluctuated due to refilling fresh water tank
Legend
Transducer
Manual
Step 4:
Total Volume Injected: 4762.28 gal
Avg. Injection Rate: 28.60 gpm
Change in Water Level: 17.62 ft
Specific Injectivity: 1.62 gpm/ft
Step 3:
Total Volume Injected: 3063.52 gal
Avg. Injection Rate: 27.71 gpm
Change in Water Level: 14.32 ft
Specific Injectivity: 1.94 gpm/ft
Injection well transducer was inadvertently not programed during step 1
Step 2:
Total Volume Injected: 2328.61 gal
Avg. Injection Rate: 18.91 gpm
Change in Water Level: 10.54 ft
Specific Injectivity: 1.79 gpm/ft
Recovery Data
Step 1:
Total Volume Injected: 1219.96 gal
Avg. Injection Rate: 9.32 gpm
Change in Water Level: 5.22 ft
Specific Injectivity: 1.79 gpm/ft
Change in Water Level (feet)
0
2
4
6
8
10
12
14
16
18
20
0
100
200
300
400
500
600
Elapsed Time (min)

IRZ-25 Lower Screen (135-166 ft)
Semi-Log Linear Change in Water Level
Plot

IRZ-25 Lower Screen (135-166 ft)
Semi-Log Linear Change in Water Level Plot

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID- **IRZ-23**

Well being tested- **IRZ-25 (Lower)**

Task- **Injectivity**

Date	Time	Date+Time	Depth to Water
10/2/2019	14:05	10/2/2019 14:05	47.82
10/2/2019	17:14	10/2/2019 17:14	47.89
10/3/2019	7:46	10/3/2019 7:46	47.89
10/3/2019	9:10	10/3/2019 9:10	47.8
10/3/2019	10:06	10/3/2019 10:06	47.79
10/3/2019	11:25	10/3/2019 11:25	47.67
10/3/2019	12:16	10/3/2019 12:16	47.65
10/3/2019	13:17	10/3/2019 13:17	47.55
10/3/2019	14:16	10/3/2019 14:16	47.56
10/3/2019	15:14	10/3/2019 15:14	47.51
10/3/2019	16:13	10/3/2019 16:13	47.41
10/3/2019	17:04	10/3/2019 17:04	47.87
10/4/2019	7:53	10/4/2019 7:53	47.87
10/4/2019	14:40	10/4/2019 14:40	47.87
10/4/2019	16:26	10/4/2019 16:26	47.86
10/5/2019	7:38	10/5/2019 7:38	47.87
10/5/2019	9:05	10/5/2019 9:05	47.59
10/5/2019	10:04	10/5/2019 10:04	47.58
10/5/2019	11:13	10/5/2019 11:13	47.46
10/5/2019	12:04	10/5/2019 12:04	47.47
10/5/2019	13:03	10/5/2019 13:03	47.40
10/5/2019	14:04	10/5/2019 14:04	47.41
10/5/2019	15:03	10/5/2019 15:03	47.37
10/5/2019	16:03	10/5/2019 16:03	47.39
10/5/2019	16:42	10/5/2019 16:42	47.63

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID- **MW-20-70**

Well being tested- **IRZ-25 (Lower)**

Task- **Injectivity**

Date	Time	Date+Time	Depth to Water
10/2/2019	14:02	10/2/2019 14:02	46.41
10/2/2019	17:12	10/2/2019 17:12	46.45
10/3/2019	7:44	10/3/2019 7:44	46.54
10/3/2019	9:09	10/3/2019 9:09	46.56
10/3/2019	10:09	10/3/2019 10:09	46.56
10/3/2019	11:24	10/3/2019 11:24	46.51
10/3/2019	12:15	10/3/2019 12:15	46.51
10/3/2019	13:15	10/3/2019 13:15	46.49
10/3/2019	14:14	10/3/2019 14:14	46.46
10/3/2019	15:20	10/3/2019 15:20	46.42
10/3/2019	16:16	10/3/2019 16:16	46.47
10/3/2019	17:01	10/3/2019 17:01	46.51
10/4/2019	8:01	10/4/2019 8:01	46.63
10/4/2019	14:38	10/4/2019 14:38	46.57
10/4/2019	16:24	10/4/2019 16:24	46.57
10/5/2019	7:36	10/5/2019 7:36	46.54
10/5/2019	9:09	10/5/2019 9:09	46.48
10/5/2019	10:03	10/5/2019 10:03	46.41
10/5/2019	11:16	10/5/2019 11:16	46.40
10/5/2019	12:03	10/5/2019 12:03	46.37
10/5/2019	13:05	10/5/2019 13:05	46.31
10/5/2019	14:03	10/5/2019 14:03	46.31
10/5/2019	15:02	10/5/2019 15:02	46.31
10/5/2019	16:02	10/5/2019 16:02	46.32
10/5/2019	16:47	10/5/2019 16:47	46.37
10/6/2019	8:13	10/6/2019 8:13	46.43
10/6/2019	13:25	10/6/2019 13:25	46.39
10/6/2019	15:20	10/6/2019 15:20	46.31
10/7/2019	7:31	10/7/2019 7:31	46.38
10/7/2019	9:04	10/7/2019 9:04	46.36
10/7/2019	10:05	10/7/2019 10:05	45.94
10/7/2019	11:03	10/7/2019 11:03	45.91
10/7/2019	12:05	10/7/2019 12:05	46.11
10/7/2019	13:06	10/7/2019 13:06	46.11
10/7/2019	14:05	10/7/2019 14:05	46.07
10/7/2019	15:07	10/7/2019 15:07	46.08
10/7/2019	16:05	10/7/2019 16:05	46.06
10/7/2019	17:00	10/7/2019 17:00	46.11

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID- MW-20-100

Well being tested- IRZ-25 (Lower)

Task- Injectivity

Date	Time	Date+Time	Depth to Water
10/2/2019	14:04	10/2/2019 14:04	47.58
10/2/2019	17:08	10/2/2019 17:08	47.62
10/3/2019	7:41	10/3/2019 7:41	47.68
10/3/2019	9:02	10/3/2019 9:02	47.65
10/3/2019	10:02	10/3/2019 10:02	47.61
10/3/2019	11:21	10/3/2019 11:21	47.51
10/3/2019	12:18	10/3/2019 12:18	47.51
10/3/2019	13:13	10/3/2019 13:13	47.44
10/3/2019	14:12	10/3/2019 14:12	47.47
10/3/2019	15:17	10/3/2019 15:17	47.47
10/3/2019	16:13	10/3/2019 16:13	47.43
10/3/2019	16:57	10/3/2019 16:57	47.62
10/4/2019	7:57	10/4/2019 7:57	47.63
10/4/2019	14:36	10/4/2019 14:36	47.64
10/4/2019	16:20	10/4/2019 16:20	47.65
10/5/2019	7:34	10/5/2019 7:34	47.42
10/5/2019	9:01	10/5/2019 9:01	47.33
10/5/2019	10:10	10/5/2019 10:10	47.31
10/5/2019	11:14	10/5/2019 11:14	47.21
10/5/2019	12:01	10/5/2019 12:01	47.21
10/5/2019	13:03	10/5/2019 13:03	47.14
10/5/2019	14:02	10/5/2019 14:02	47.16
10/5/2019	15:01	10/5/2019 15:01	47.14
10/5/2019	16:01	10/5/2019 16:01	47.14
10/5/2019	16:45	10/5/2019 16:45	47.44
10/6/2019	8:10	10/6/2019 8:10	47.36
10/6/2019	13:22	10/6/2019 13:22	47.39
10/6/2019	15:16	10/6/2019 15:16	47.41
10/7/2019	7:28	10/7/2019 7:28	47.28
10/7/2019	9:02	10/7/2019 9:02	47.25
10/7/2019	10:03	10/7/2019 10:03	45.64
10/7/2019	11:01	10/7/2019 11:01	46.91
10/7/2019	12:03	10/7/2019 12:03	47.12
10/7/2019	13:04	10/7/2019 13:04	47.14
10/7/2019	14:03	10/7/2019 14:03	47.15
10/7/2019	15:04	10/7/2019 15:04	47.18
10/7/2019	16:03	10/7/2019 16:03	47.21
10/7/2019	16:56	10/7/2019 16:56	47.27

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID- MW-20-130

Well being tested- IRZ-25 (lower)

Task- Injectivity

Date	Time	Date+Time	Depth to Water
10/2/2019	13:59	10/2/2019 13:59	48.53
10/2/2019	17:10	10/2/2019 17:10	48.61
10/3/2019	7:42	10/3/2019 7:42	48.50
10/3/2019	9:07	10/3/2019 9:07	48.36
10/3/2019	10:03	10/3/2019 10:03	48.31
10/3/2019	11:22	10/3/2019 11:22	48.02
10/3/2019	12:14	10/3/2019 12:14	48.02
10/3/2019	13:14	10/3/2019 13:14	47.81
10/3/2019	14:13	10/3/2019 14:13	47.81
10/3/2019	15:19	10/3/2019 15:19	47.61
10/3/2019	16:14	10/3/2019 16:14	47.63
10/3/2019	16:59	10/3/2019 16:59	48.60
10/4/2019	7:59	10/4/2019 7:59	48.51
10/4/2019	14:37	10/4/2019 14:37	48.52
10/4/2019	16:22	10/4/2019 16:22	48.56
10/5/2019	7:35	10/5/2019 7:35	48.24
10/5/2019	9:03	10/5/2019 9:03	48.16
10/5/2019	10:02	10/5/2019 10:02	48.10
10/5/2019	11:15	10/5/2019 11:15	48.11
10/5/2019	12:02	10/5/2019 12:02	48.11
10/5/2019	13:04	10/5/2019 13:04	48.09
10/5/2019	14:02	10/5/2019 14:02	48.10
10/5/2019	15:01	10/5/2019 15:01	48.11
10/5/2019	16:01	10/5/2019 16:01	48.13
10/5/2019	16:46	10/5/2019 16:46	48.24
10/6/2019	8:12	10/6/2019 8:12	48.13
10/6/2019	13:23	10/6/2019 13:23	48.25
10/6/2019	15:18	10/6/2019 15:18	48.32
10/7/2019	7:29	10/7/2019 7:29	48.07
10/7/2019	9:03	10/7/2019 9:03	48.06
10/7/2019	10:04	10/7/2019 10:04	47.76
10/7/2019	11:02	10/7/2019 11:02	47.76
10/7/2019	12:04	10/7/2019 12:04	48.01
10/7/2019	13:05	10/7/2019 13:05	48.02
10/7/2019	14:04	10/7/2019 14:04	48.06
10/7/2019	15:05	10/7/2019 15:05	48.11
10/7/2019	16:04	10/7/2019 16:04	48.15
10/7/2019	16:58	10/7/2019 16:58	48.19

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID- MW-E-70

Well being tested- IRZ-25 (Lower)

Task- Injectivity

Date	Time	Date+Time	Depth to Water
10/2/2019	14:08	10/2/2019 14:08	47.11
10/2/2019	17:17	10/2/2019 17:17	47.19
10/3/2019	7:48	10/3/2019 7:48	46.77
10/3/2019	9:12	10/3/2019 9:12	46.76
10/3/2019	10:09	10/3/2019 10:09	46.72
10/3/2019	11:27	10/3/2019 11:27	56.69
10/3/2019	12:18	10/3/2019 12:18	46.65
10/3/2019	13:19	10/3/2019 13:19	46.61
10/3/2019	14:18	10/3/2019 14:18	46.60
10/3/2019	15:23	10/3/2019 15:23	36.58
10/3/2019	16:20	10/3/2019 16:20	46.59
10/3/2019	17:07	10/3/2019 17:07	46.63
10/4/2019	7:50	10/4/2019 7:50	48.81
10/4/2019	14:42	10/4/2019 14:42	46.75
10/4/2019	16:29	10/4/2019 16:29	46.74
10/5/2019	7:41	10/5/2019 7:41	46.78
10/5/2019	9:09	10/5/2019 9:09	46.71
10/5/2019	10:09	10/5/2019 10:09	46.66
10/5/2019	11:18	10/5/2019 11:18	46.58
10/5/2019	12:06	10/5/2019 12:06	46.55
10/5/2019	12:08	10/5/2019 12:08	46.46
10/5/2019	14:06	10/5/2019 14:06	46.41
10/5/2019	15:04	10/5/2019 15:04	46.41
10/5/2019	16:04	10/5/2019 16:04	46.36
10/5/2019	16:49	10/5/2019 16:49	46.54
10/6/2019	8:16	10/6/2019 8:16	46.71
10/6/2019	13:27	10/6/2019 13:27	46.64
10/6/2019	15:25	10/6/2019 15:25	46.58
10/7/2019	7:34	10/7/2019 7:34	46.24
10/7/2019	9:11	10/7/2019 9:11	46.61
10/7/2019	10:08	10/7/2019 10:08	46.34
10/7/2019	11:05	10/7/2019 11:05	46.34
10/7/2019	12:16	10/7/2019 12:16	46.38
10/7/2019	13:09	10/7/2019 13:09	46.33
10/7/2019	14:08	10/7/2019 14:08	46.29
10/7/2019	15:10	10/7/2019 15:10	46.23
10/7/2019	16:15	10/7/2019 16:15	46.22
10/7/2019	17:04	10/7/2019 17:04	46.29

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID- MW-E-142

Well being tested- IRZ-25 (Lower)

Task- Injectivity

Date	Time	Date+Time	Depth to Water
10/2/2019	14:08	10/2/2019 14:08	46.60
10/2/2019	17:18	10/2/2019 17:18	46.68
10/3/2019	7:50	10/3/2019 7:50	47.21
10/3/2019	9:13	10/3/2019 9:13	45.89
10/3/2019	10:10	10/3/2019 10:10	45.89
10/3/2019	11:28	10/3/2019 11:28	44.71
10/3/2019	12:19	10/3/2019 12:19	44.61
10/3/2019	13:18	10/3/2019 13:18	43.80
10/3/2019	14:19	10/3/2019 14:19	43.81
10/3/2019	15:15	10/3/2019 15:15	43.14
10/3/2019	16:21	10/3/2019 16:21	43.15
10/3/2019	17:09	10/3/2019 17:09	47.13
10/4/2019	7:48	10/4/2019 7:48	47.20
10/4/2019	14:43	10/4/2019 14:43	47.21
10/4/2019	16:30	10/4/2019 16:30	47.21
10/5/2019	7:42	10/5/2019 7:42	47.04
10/5/2019	9:10	10/5/2019 9:10	46.97
10/5/2019	10:09	10/5/2019 10:09	46.95
10/5/2019	11:18	10/5/2019 11:18	46.87
10/5/2019	12:06	10/5/2019 12:06	46.87
10/5/2019	13:09	10/5/2019 13:09	46.80
10/5/2019	14:03	10/5/2019 14:03	46.82
10/5/2019	15:05	10/5/2019 15:05	46.78
10/5/2019	16:05	10/5/2019 16:05	46.79
10/5/2019	16:50	10/5/2019 16:50	47.05
10/6/2019	8:17	10/6/2019 8:17	47.02
10/6/2019	13:29	10/6/2019 13:29	47.04
10/6/2019	15:26	10/6/2019 15:26	47.06
10/7/2019	7:35	10/7/2019 7:35	46.95
10/7/2019	9:12	10/7/2019 9:12	46.90
10/7/2019	11:06	10/7/2019 11:06	46.71
10/7/2019	12:17	10/7/2019 12:17	46.82
10/7/2019	13:10	10/7/2019 13:10	46.81
10/7/2019	14:09	10/7/2019 14:09	46.81
10/7/2019	15:11	10/7/2019 15:11	46.84
10/7/2019	16:16	10/7/2019 16:16	46.84
10/7/2019	17:05	10/7/2019 17:05	46.92

IRZ-23 Water Level During IRZ-25 Lower Screen (135-166 ft) Injection Test
Step 1
Step 2
Step 3
Step 4
Flow rates fluctuated due to refilling fresh water tank
Distance to IRZ-25: 118' 1"
Legend
Transducer
Manual
Recovery Data
Depth to Water (feet)
49.0
48.5
48.0
47.5
47.0
46.5
10/3/19 6:00
10/3/19 9:00
10/3/19 12:00
10/3/19 15:00
10/3/19 18:00
Date and Time
Step 1:
Total Volume Injected: 1219.96 gal
Avg. Injection Rate: 9.32 gpm
Change in Water Level in IRZ-25: 5.22 ft
Specific Injectivity: 1.79 gpm/ft
Step 2:
Total Volume Injected: 2328.61 gal
Avg. Injection Rate: 18.91 gpm
Change in Water Level in IRZ-25: 10.54 ft
Specific Injectivity: 1.79 gpm/ft
Step 3:
Total Volume Injected: 3063.52 gal
Avg. Injection Rate: 27.71 gpm
Change in Water Level in IRZ-25: 14.32 ft
Specific Injectivity: 1.94 gpm/ft
Step 4:
Total Volume Injected: 4762.28 gal
Avg. Injection Rate: 28.60 gpm
Change in Water Level in IRZ-25: 17.62 ft
Specific Injectivity: 1.62 gpm/ft

MW-20-070 Water Level During IRZ-25 Lower Screen (135-166 ft) Injection Test
Step 1
Step 2
Step 3
Step 4
Flow rates fluctuated due to refilling fresh water tank
Distance to IRZ-25: 101' 9"
Legend
Transducer
Manual
Recovery Data
Depth to Water (feet)
47.2
47.0
46.8
46.6
46.4
46.2
46.0
45.8
45.6
45.4
45.2
10/3/19 6:00
10/3/19 9:00
10/3/19 12:00
10/3/19 15:00
10/3/19 18:00
Date and Time
Step 1:
Total Volume Injected: 1219.96 gal
Avg. Injection Rate: 9.32 gpm
Change in Water Level in IRZ-25: 5.22 ft
Specific Injectivity: 1.79 gpm/ft
Step 2:
Total Volume Injected: 2328.61 gal
Avg. Injection Rate: 18.91 gpm
Change in Water Level in IRZ-25: 10.54 ft
Specific Injectivity: 1.79 gpm/ft
Step 3:
Total Volume Injected: 3063.52 gal
Avg. Injection Rate: 27.71 gpm
Change in Water Level in IRZ-25: 14.32 ft
Specific Injectivity: 1.94 gpm/ft
Step 4:
Total Volume Injected: 4762.28 gal
Avg. Injection Rate: 28.60 gpm
Change in Water Level in IRZ-25: 17.62 ft
Specific Injectivity: 1.62 gpm/ft

MW-20-130 Water Level During IRZ-25 Lower Screen (135-166 ft) Injection Test
Step 1
Step 2
Step 3
Step 4
Flow rates fluctuated due to refilling fresh water tank
Distance to IRZ-25: 95' 10"
Legend
Transducer
Manual
Recovery Data
Depth to Water (feet)
49.5
49.0
48.5
48.0
47.5
47.0
46.5
10/3/19 6:00
10/3/19 9:00
10/3/19 12:00
10/3/19 15:00
10/3/19 18:00
Date and Time
Step 1:
Total Volume Injected: 1219.96 gal
Avg. Injection Rate: 9.32 gpm
Change in Water Level in IRZ-25: 5.22 ft
Specific Injectivity: 1.79 gpm/ft
Step 2:
Total Volume Injected: 2328.61 gal
Avg. Injection Rate: 18.91 gpm
Change in Water Level in IRZ-25: 10.54 ft
Specific Injectivity: 1.79 gpm/ft
Step 3:
Total Volume Injected: 3063.52 gal
Avg. Injection Rate: 27.71 gpm
Change in Water Level in IRZ-25: 14.32 ft
Specific Injectivity: 1.94 gpm/ft
Step 4:
Total Volume Injected: 4762.28 gal
Avg. Injection Rate: 28.60 gpm
Change in Water Level in IRZ-25: 17.62 ft
Specific Injectivity: 1.62 gpm/ft

MW-20-100 Water Level During IRZ-25 Lower Screen (135-166 ft) Injection Test
Step 1
Step 2
Step 3
Step 4
Flow rates fluctuated due to refilling fresh water tank
Distance to IRZ-25: 104' 2"
Legend
Transducer
Manual
Recovery Data
Depth to Water (feet)
49.0
48.5
48.0
47.5
47.0
46.5
46.0
10/3/19 6:00
10/3/19 9:00
10/3/19 12:00
10/3/19 15:00
10/3/19 18:00
Date and Time
Step 1:
Total Volume Injected: 1219.96 gal
Avg. Injection Rate: 9.32 gpm
Change in Water Level in IRZ-25: 5.22 ft
Specific Injectivity: 1.79 gpm/ft
Step 2:
Total Volume Injected: 2328.61 gal
Avg. Injection Rate: 18.91 gpm
Change in Water Level in IRZ-25: 10.54 ft
Specific Injectivity: 1.79 gpm/ft
Step 3:
Total Volume Injected: 3063.52 gal
Avg. Injection Rate: 27.71 gpm
Change in Water Level in IRZ-25: 14.32 ft
Specific Injectivity: 1.94 gpm/ft
Step 4:
Total Volume Injected: 4762.28 gal
Avg. Injection Rate: 28.60 gpm
Change in Water Level in IRZ-25: 17.62 ft
Specific Injectivity: 1.62 gpm/ft

MW-E-70 Water Level During IRZ-25 Lower Screen (135-166 ft) Injection Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-25: 83' 1"
Flow rates fluctuated due to refilling fresh water tank
Legend
Transducer
Manual
48.0
47.5
47.0
46.5
46.0
45.5
45.0
Depth to Water (feet)
10/3/19 6:00
10/3/19 9:00
10/3/19 12:00
10/3/19 15:00
10/3/19 18:00
Date and Time
Step 1:
Total Volume Injected: 1219.96 gal
Avg. Injection Rate: 9.32 gpm
Change in Water Level in IRZ-25: 5.22 ft
Specific Injectivity: 1.79 gpm/ft
Step 2:
Total Volume Injected: 2328.61 gal
Avg. Injection Rate: 18.91 gpm
Change in Water Level in IRZ-25: 10.54 ft
Specific Injectivity: 1.79 gpm/ft
Step 3:
Total Volume Injected: 3063.52 gal
Avg. Injection Rate: 27.71 gpm
Change in Water Level in IRZ-25: 14.32 ft
Specific Injectivity: 1.94 gpm/ft
Step 4:
Total Volume Injected: 4762.28 gal
Avg. Injection Rate: 28.60 gpm
Change in Water Level in IRZ-25: 17.62 ft
Specific Injectivity: 1.62 gpm/ft

MW-E-142 Water Level During IRZ-25 Lower Screen (135-166 ft) Injection Test
Step 1
Step 2
Step 3
Step 4
Flow rates fluctuated due to refilling fresh water tank
Distance to IRZ-25: 82' 8"
Legend
Transducer
Manual
Depth to Water (feet)
50.0
49.0
48.0
47.0
46.0
45.0
44.0
43.0
42.0
41.0
40.0
10/3/19 6:00
10/3/19 9:00
10/3/19 12:00
10/3/19 15:00
10/3/19 18:00
Date and Time
Step 1:
Total Volume Injected: 1219.96 gal
Avg. Injection Rate: 9.32 gpm
Change in Water Level in IRZ-25: 5.22 ft
Specific Injectivity: 1.79 gpm/ft
Step 2:
Total Volume Injected: 2328.61 gal
Avg. Injection Rate: 18.91 gpm
Change in Water Level in IRZ-25: 10.54 ft
Specific Injectivity: 1.79 gpm/ft
Step 3:
Total Volume Injected: 3063.52 gal
Avg. Injection Rate: 27.71 gpm
Change in Water Level in IRZ-25: 14.32 ft
Specific Injectivity: 1.94 gpm/ft
Step 4:
Total Volume Injected: 4762.28 gal
Avg. Injection Rate: 28.60 gpm
Change in Water Level in IRZ-25: 17.62 ft
Specific Injectivity: 1.62 gpm/ft

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	**IRZ-39**
Date -	**11/5/2019**
Screened Interval Tested -	**28'-39' bgs**
Tests Conducted -	3 step Specific Capacity Test (1, 1.5, 2 GPM Respectfully)
Purpose -	Well Performance Test
Summary -	Specific Capacity: 0.40-0.83 GPM/FT

Notes -

Due to significant drawdown of water levels during the initial specific capactiy evaluation, flow rates were adjusted from the initial design Flow rates 2.5 (50%), 5 (100%), 7.5 (150%), and 10 (200%) gpm to 1, 1.5 and 2 gpm to pervent dewatering of well.

Due to significant drawdown of water levels during testing, final step at 2 gpm was extended from 2 hours to 4 hours.

IM3 was shut down from approximately 9:50 am until 1:15 PM and may have influenced groundwater readings during step 3 of test.

Transducer data show little to no change in water level readings compaired to manual water level readings within monitoring points MW-12 and MW-71-035.

Oversight Signature -	
Date -	1/2/2020

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	**IRZ-39**
Date -	**11/5/2019**
Screened Interval -	**28'-39' bgs**
Pump Depth (ft btoc) -	**41.75**
Initial Water Level (ft btoc) -	**28.50**
Initial Totalizer Reading (gal) -	**0**
Final Totalizer Reading (gal) -	**795.28**
Approx. Pumped Volume (gal) -	**795.28**
Calculated Volume Purged (gal) -	**789.29**
Actual vs. Calculated Gallons Pumped -	**5.99**
Number of Specific Capacity Steps -	**3**
Pumping Rates (List In Order) -	**1, 1.5, and 2 GPM Respectfully**

Step 1						
Time (HR:MN:SEC)	Change in Time between Measurements (Min)	Elapsed Time (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)
8:30:00	0.00	0.00	0.00	0.00	28.50	0.00
8:30:20	0.33	0.33	0.06	0.02	29.54	1.04
8:30:40	0.33	0.67	0.94	0.33	29.58	1.08
8:31:00	0.33	1.00	1.18	0.73	29.60	1.10
8:32:00	1.00	2.00	1.03	1.76	29.58	1.08
8:33:00	1.00	3.00	1.16	2.92	29.55	1.05
8:34:00	1.00	4.00	1.12	4.04	29.55	1.05
8:35:00	1.00	5.00	1.08	5.12	29.49	0.99
8:36:00	1.00	6.00	1.06	6.18	29.50	1.00
8:37:00	1.00	7.00	1.04	7.22	29.50	1.00
8:38:00	1.00	8.00	1.04	8.26	29.50	1.00
8:39:00	1.00	9.00	1.04	9.30	29.50	1.00
8:40:00	1.00	10.00	0.92	10.22	29.50	1.00
8:42:00	2.00	12.00	1.04	12.30	29.50	1.00
8:44:00	2.00	14.00	1.03	14.36	29.50	1.00
8:46:00	2.00	16.00	1.04	16.44	29.50	1.00
8:48:00	2.00	18.00	1.03	18.50	29.50	1.00
8:50:00	2.00	20.00	1.03	20.56	29.54	1.04
8:52:00	2.00	22.00	1.03	22.62	29.53	1.03
8:54:00	2.00	24.00	1.03	24.68	29.53	1.03
8:56:00	2.00	26.00	0.98	26.64	29.54	1.04
8:58:00	2.00	28.00	1.03	28.70	29.54	1.04
9:00:00	2.00	30.00	1.03	30.76	29.55	1.05
9:05:00	5.00	35.00	0.88	35.16	29.56	1.06
9:10:00	5.00	40.00	1.06	40.46	29.52	1.02
9:15:00	5.00	45.00	1.06	45.76	29.53	1.03
9:20:00	5.00	50.00	1.06	51.06	29.62	1.12
9:25:00	5.00	55.00	1.06	56.36	29.65	1.15
9:30:00	5.00	60.00	1.04	61.56	29.65	1.15
9:40:00	10.00	70.00	1.04	71.96	29.66	1.16
9:50:00	10.00	80.00	1.04	82.36	29.66	1.16
10:00:00	10.00	90.00	1.04	92.76	29.68	1.18
10:10:00	10.00	100.00	1.03	103.06	29.70	1.20
10:20:00	10.00	110.00	1.04	113.46	29.70	1.20
10:30:00	10.00	120.00	1.03	123.76	29.71	1.21
Total Volume Pumped for Step 1 (GAL):			123.76			
Average Pumping Rate (GPM):			1.01			
Specific Capacity (GPM/FT):			0.83			

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	**IRZ-39**
Date -	**11/5/2019**
Screened Interval -	**28'-39' bgs**
Pump Depth (ft btoc) -	**41.75**
Initial Water Level (ft btoc) -	**28.50**
Initial Totalizer Reading (gal) -	**0**
Final Totalizer Reading (gal) -	**795.28**
Approx. Pumped Volume (gal) -	**795.28**
Calculated Volume Purged (gal) -	**789.29**
Actual vs. Calculated Gallons Injected -	**5.99**
Number of Specific Capacity Steps -	**3**
Pumping Rates (List In Order) -	**1, 1.5, and 2 GPM Respectfully**

Step 2							
Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 2 Start (Min)
10:30:20	0.33	120.33	1.73	124.33	29.81	1.31	0.33
10:30:40	0.33	120.67	1.37	124.79	29.85	1.35	0.67
10:31:00	0.33	121.00	1.32	125.23	29.87	1.37	1.00
10:32:00	1.00	122.00	1.59	126.82	29.91	1.41	2.00
10:33:00	1.00	123.00	1.51	128.33	29.97	1.47	3.00
10:34:00	1.00	124.00	1.49	129.82	30.00	1.50	4.00
10:35:00	1.00	125.00	1.51	131.33	30.02	1.52	5.00
10:36:00	1.00	126.00	1.53	132.86	30.03	1.53	6.00
10:37:00	1.00	127.00	1.53	134.39	30.08	1.58	7.00
10:38:00	1.00	128.00	1.51	135.90	30.08	1.58	8.00
10:39:00	1.00	129.00	1.51	137.41	30.10	1.60	9.00
10:40:00	1.00	130.00	1.51	138.92	30.10	1.60	10.00
10:42:00	2.00	132.00	1.51	141.94	30.11	1.61	12.00
10:44:00	2.00	134.00	1.51	144.96	30.12	1.62	14.00
10:46:00	2.00	136.00	1.49	147.94	30.16	1.66	16.00
10:48:00	2.00	138.00	1.66	151.26	30.18	1.68	18.00
10:50:00	2.00	140.00	1.56	154.38	30.21	1.71	20.00
10:52:00	2.00	142.00	1.54	157.46	30.21	1.71	22.00
10:54:00	2.00	144.00	1.54	160.54	30.25	1.75	24.00
10:56:00	2.00	146.00	1.54	163.62	30.28	1.78	26.00
10:58:00	2.00	148.00	1.53	166.68	30.29	1.79	28.00
11:00:00	2.00	150.00	1.51	169.70	30.28	1.78	30.00
11:05:00	5.00	155.00	1.51	177.25	30.29	1.79	35.00
11:10:00	5.00	160.00	1.51	184.80	30.30	1.80	40.00
11:15:00	5.00	165.00	1.51	192.35	30.32	1.82	45.00
11:20:00	5.00	170.00	1.51	199.90	30.33	1.83	50.00
11:25:00	5.00	175.00	1.51	207.45	30.34	1.84	55.00
11:30:00	5.00	180.00	1.51	215.00	30.35	1.85	60.00
11:40:00	10.00	190.00	1.53	230.30	30.40	1.90	70.00
11:50:00	10.00	200.00	1.53	245.60	30.40	1.90	80.00
12:00:00	10.00	210.00	1.51	260.70	30.43	1.93	90.00
12:10:00	10.00	220.00	1.51	275.80	30.45	1.95	100.00
12:20:00	10.00	230.00	1.51	290.90	30.48	1.98	110.00
12:30:00	10.00	240.00	1.54	306.30	30.50	2.00	120.00

Total Volume Pumped for Step 2 (GAL):	182.54
Average Pumping Rate (GPM):	1.52
Specific Capacity (GPM/FT):	0.76

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	**IRZ-39**
Date -	**11/5/2019**
Screened Interval -	**28'-39' bgs**
Pump Depth (ft btoc) -	**41.75**
Initial Water Level (ft btoc) -	**28.50**
Initial Totalizer Reading (gal) -	**0**
Final Totalizer Reading (gal) -	**795.28**
Approx. Pumped Volume (gal) -	**795.28**
Calculated Volume Purged (gal) -	**789.29**
Actual vs. Calculated Gallons Injected -	**5.99**
Number of Specific Capacity Steps -	**3**
Pumping Rates (List In Order) -	**1, 1.5, and 2 GPM Respectfully**

Step 3

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 3 Start (Min)
12:30:20	0.33	240.33	2.33	307.08	30.65	2.15	0.33
12:30:40	0.33	240.67	2.06	307.76	30.71	2.21	0.67
12:31:00	0.33	241.00	2.06	308.45	30.67	2.17	1.00
12:32:00	1.00	242.00	2.04	310.49	30.77	2.27	2.00
12:33:00	1.00	243.00	2.02	312.51	30.82	2.32	3.00
12:34:00	1.00	244.00	2.02	314.53	30.87	2.37	4.00
12:35:00	1.00	245.00	2.01	316.54	30.95	2.45	5.00
12:36:00	1.00	246.00	2.02	318.56	31.00	2.50	6.00
12:37:00	1.00	247.00	2.01	320.57	31.02	2.52	7.00
12:38:00	1.00	248.00	2.01	322.58	31.07	2.57	8.00
12:39:00	1.00	249.00	2.01	324.59	31.11	2.61	9.00
12:40:00	1.00	250.00	2.01	326.60	31.13	2.63	10.00
12:42:00	2.00	252.00	2.01	330.62	31.18	2.68	12.00
12:44:00	2.00	254.00	2.01	334.64	31.21	2.71	14.00
12:46:00	2.00	256.00	2.01	338.66	31.25	2.75	16.00
12:48:00	2.00	258.00	2.01	342.68	31.27	2.77	18.00
12:50:00	2.00	260.00	2.01	346.70	31.29	2.79	20.00
12:52:00	2.00	262.00	2.01	350.72	31.32	2.82	22.00
12:54:00	2.00	264.00	1.99	354.70	31.33	2.83	24.00
12:56:00	2.00	266.00	1.99	358.68	31.34	2.84	26.00
12:58:00	2.00	268.00	1.99	362.66	31.36	2.86	28.00
13:00:00	2.00	270.00	1.99	366.64	31.39	2.89	30.00
13:05:00	5.00	275.00	1.99	376.59	31.40	2.90	35.00
13:10:00	5.00	280.00	1.99	386.54	31.45	2.95	40.00
13:15:00	5.00	285.00	1.97	396.39	31.46	2.96	45.00
13:20:00	5.00	290.00	2.04	406.59	31.58	3.08	50.00
13:25:00	5.00	295.00	2.04	416.79	31.63	3.13	55.00
13:30:00	5.00	300.00	2.04	426.99	31.66	3.16	60.00
13:40:00	10.00	310.00	2.02	447.19	31.71	3.21	70.00
13:50:00	10.00	320.00	2.02	467.39	31.74	3.24	80.00
14:00:00	10.00	330.00	2.02	487.59	31.80	3.30	90.00
14:10:00	10.00	340.00	2.02	507.79	31.84	3.34	100.00
14:20:00	10.00	350.00	2.02	527.99	32.05	3.55	110.00
14:30:00	10.00	360.00	2.02	548.19	32.01	3.51	120.00
14:40:00	10.00	370.00	2.02	568.39	32.06	3.56	130.00
14:50:00	10.00	380.00	2.02	588.59	32.09	3.59	140.00
15:00:00	10.00	390.00	2.02	608.79	32.10	3.60	150.00
15:10:00	10.00	400.00	2.02	628.99	32.16	3.66	160.00
15:20:00	10.00	410.00	2.02	649.19	32.20	3.70	170.00
15:30:00	10.00	420.00	1.99	669.09	32.98	4.48	180.00
15:40:00	10.00	430.00	1.99	688.99	33.85	5.35	190.00
15:50:00	10.00	440.00	2.01	709.09	33.92	5.42	200.00
16:00:00	10.00	450.00	2.01	729.19	33.76	5.26	210.00
16:10:00	10.00	460.00	2.01	749.29	33.70	5.20	220.00
16:20:00	10.00	470.00	1.99	769.19	33.65	5.15	230.00
16:30:00	10.00	480.00	2.01	789.29	33.61	5.11	240.00

Total Volume Pumped for Step 3 (GAL):	482.99
Average Pumping Rate (GPM):	2.02
Specific Capacity (GPM/FT):	0.40

IRZ-39 Linear Drawdown Plot
Step 1:
Step 1 Total Volume Pumped: 123.76 gal
Avg. Flow Rate: 1.01 gpm
Drawdown: 1.21 ft
Specific Capacity: 0.83 gpm/ft
Step 2:
Step 2 Total Volume Pumped: 182.54 gal
Avg. Flow Rate: 1.52 gpm
Drawdown: 2.00 ft
Specific Capacity: 0.76 gpm/ft
Step 3:
Step 3 Total Volume Pumped: 482.99 gal
Avg. Flow Rate: 2.02 gpm
Drawdown: 5.11 ft
Specific Capacity: 0.40 gpm/ft
Legend
Transducer
Manual
Recovery Data
Possible Influence from IM3 Start Up
Drawdown (feet)
Elapsed Time (min)
0
1
2
3
4
5
6
0
50
100
150
200
250
300
350
400
450
500

IRZ-39 Semi-Log Drawdown Plot

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID- **MW-12**

Well being tested- **IRZ-39**

Screened Interval of well being tested - **28'-39' bgs**

Date	Time	Date+Time	Depth to Water
11/4/19	12:15	12:15	28.77
11/5/19	7:57	7:57	28.86
11/5/19	9:07	9:07	28.87
11/5/19	9:43	9:43	28.86
11/5/19	12:14	12:14	28.85
11/5/19	13:01	13:01	28.8
11/5/19	14:02	14:02	28.76
11/5/19	15:03	15:03	28.8
11/5/19	15:49	15:49	28.8
11/5/19	16:35	16:35	28.8
11/6/19	7:27	7:27	28.88
11/6/19	9:43	9:43	28.84
11/6/19	11:45	11:45	28.81
11/6/19	13:18	13:18	28.8
11/6/19	14:20	14:20	28.8
11/6/19	15:13	15:13	28.8
11/6/19	15:34	15:34	28.8
11/7/19	7:06	7:06	28.92
11/7/19	7:51	7:51	28.92
11/7/19	8:45	8:45	28.92
11/7/19	9:51	9:51	28.9
11/7/19	10:43	10:43	28.89
11/7/19	11:11	11:11	28.89
11/7/19	11:51	11:51	28.89

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID- MW-71-035

Well being tested- IRZ-39

Screened Interval of well being tested - 28'-39' bgs

Date	Time	Date+Time	Depth to Water
11/4/19	11:45	11:45	28.47
11/5/19	8:00	8:00	28.51
11/5/19	9:03	9:03	28.51
11/5/19	9:46	9:46	28.52
11/5/19	12:06	12:06	28.52
11/5/19	13:05	13:05	28.52
11/5/19	14:00	14:00	28.52
11/5/19	15:07	15:07	28.53
11/5/19	15:47	15:47	28.51
11/5/19	16:35	16:35	28.52
11/6/19	7:31	7:31	28.53
11/6/19	9:40	9:40	28.54
11/6/19	11:48	11:48	28.54
11/6/19	13:15	13:15	28.55
11/6/19	14:23	14:23	28.55
11/6/19	15:08	15:08	28.54
11/6/19	15:40	15:40	28.54
11/7/19	7:00	7:00	28.58
11/7/19	7:54	7:54	28.54
11/7/19	8:43	8:43	28.60
11/7/19	9:54	9:54	28.60
11/7/19	10:40	10:40	28.60
11/7/19	11:13	11:13	28.59
11/7/19	11:47	11:47	28.59

MW-12 Water Level During IRZ-39 Specific Capacity Test
Step 1
Step 2
Step 3
Distance to IRZ-39: ~190 Feet
Transducer data show little to no change in water level readings compaired to manual water level readings
Possible Influence from IM3 Start Up
Step 1:
Total Volume Pumped: 123.76 gal
Avg. Flow Rate: 1.01 gpm
Drawdown in IRZ-39: 1.21 ft
Specific Capacity: 0.83 gpm/ft
Step 2:
Total Volume Pumped: 182.54 gal
Avg. Flow Rate: 1.52 gpm
Drawdown in IRZ-39: 2.00 ft
Specific Capacity: 0.76 gpm/ft
Step 3:
Total Volume Pumped: 482.99 gal
Avg. Flow Rate: 2.02 gpm
Drawdown in IRZ-39: 5.11 ft
Specific Capacity: 0.40 gpm/ft
Depth to Water (feet)
29.10
29.00
28.90
28.80
28.70
28.60
28.50
11/5/19 6:00
11/5/19 9:00
11/5/19 12:00
11/5/19 15:00
11/5/19 18:00
Date and Time

MW-71-35 Water Level During IRZ-39 Specific Capacity Test
Step 1
Step 2
Step 3
Transducer data show little to no change in water level readings compaired to manual water level readings
Distance to IRZ-39: ~80 Feet
Possible Influence from IM3 Start Up
Step 1:
Total Volume Pumped: 123.76 gal
Avg. Flow Rate: 1.01 gpm
Drawdown in IRZ-39: 1.21 ft
Specific Capacity: 0.83 gpm/ft
Step 2:
Total Volume Pumped: 182.54 gal
Avg. Flow Rate: 1.52 gpm
Drawdown in IRZ-39: 2.00 ft
Specific Capacity: 0.76 gpm/ft
Step 3:
Total Volume Pumped: 482.99 gal
Avg. Flow Rate: 2.02 gpm
Drawdown in IRZ-39: 5.11 ft
Specific Capacity: 0.40 gpm/ft
Depth to Water (feet)
29
28.9
28.8
28.7
28.6
28.5
28.4
28.3
28.2
11/5/19 6:00
11/5/19 9:00
11/5/19 12:00
11/5/19 15:00
11/5/19 18:00
Date and Time

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	**IRZ-39**
Date -	**11/6/2019-11/12/2019**
Screened Interval Tested -	**28-39 ft**
Tests Conducted -	5 step Injectivity Test (2.5, 5, 7.5, 10 and 15 GPM Respectfully)
Purpose -	Well Performance Test
Summary -	Specific Injectivity: 0.91-1.08 GPM/FT
Notes -	Test was split up into mulitiple days due to time constrictions.
	Clean Harbors filled construction water tank up during steps 4 and 5 of test.
	Transducer data show little to no change in water level readings compaired to manual water level readings within monitoring points MW-12 and MW-71-035.
Oversight Signature -	
Date -	1/3/2020

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	**IRZ-39**
Date -	**11/6/2019**
Screened Interval -	**28'-39' bgs**
Injection Water Source -	**Fresh water from construction water supply system**
Injection Outlet Depth -	**40 ft. bgs**
Initial Water Level (ft btoc) -	**28.03**
Initial Totalizer Reading (gal) -	**0**
Final Totalizer Reading (gal) -	**303.68**
Approx. Injected Volume (gal) -	**303.68**
Calculated Volume Injected (gal) -	**301.49**
Actual vs. Calculated Gallons Injected -	**2.19**
Number of Specific Capacity Steps -	**1**
Injection Rates (List In Order) -	**2.5 GPM Respectfully**

Step 1					
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)
13:20:00	0.00	0.00	0.00	28.03	0.00
13:20:20	0.33	3.62	1.21	27.55	0.48
13:20:40	0.67	1.83	1.82	27.34	0.69
13:21:00	1.00	2.62	2.69	27.15	0.88
13:22:00	2.00	2.47	5.16	26.74	1.29
13:23:00	3.00	2.54	7.70	26.49	1.54
13:24:00	4.00	2.54	10.24	26.32	1.71
13:25:00	5.00	2.54	12.78	26.18	1.85
13:26:00	6.00	2.54	15.32	26.09	1.94
13:27:00	7.00	2.55	17.87	26.03	2.00
13:28:00	8.00	2.54	20.41	26.00	2.03
13:29:00	9.00	2.54	22.95	25.95	2.08
13:30:00	10.00	2.55	25.50	25.91	2.12
13:32:00	12.00	2.55	30.60	25.86	2.17
13:34:00	14.00	2.55	35.70	25.81	2.22
13:36:00	16.00	2.55	40.80	25.79	2.24
13:38:00	18.00	2.55	45.90	25.76	2.27
13:40:00	20.00	2.55	51.00	25.74	2.29
13:42:00	22.00	2.55	56.10	25.71	2.32
13:44:00	24.00	2.73	61.56	25.77	2.26
13:46:00	26.00	2.51	66.58	25.71	2.32
13:48:00	28.00	2.52	71.62	25.70	2.33
13:50:00	30.00	2.51	76.64	25.70	2.33
13:55:00	35.00	2.49	89.09	25.71	2.32
14:00:00	40.00	2.51	101.64	25.71	2.32
14:05:00	45.00	2.49	114.09	25.71	2.32
14:10:00	50.00	2.51	126.64	25.72	2.31
14:15:00	55.00	2.47	138.99	25.72	2.31
14:20:00	60.00	2.54	151.69	25.69	2.34
14:30:00	70.00	2.51	176.79	25.68	2.35
14:40:00	80.00	2.47	201.49	25.69	2.34
14:50:00	90.00	2.46	226.09	25.70	2.33
15:00:00	100.00	2.54	251.49	25.65	2.38
15:10:00	110.00	2.51	276.59	25.66	2.37
15:20:00	120.00	2.49	301.49	25.67	2.36

Total Volume Injected During Step (GAL):	301.49
Average Injection Rate (GPM):	2.54
Specific Injectivity (GPM/FT):	1.08

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	**IRZ-39**
Date -	**11/7/2019**
Screened Interval -	**28'-39' bgs**
Injection Water Source -	**Fresh water from construction water supply system**
Injection Outlet Depth -	**40 ft. bgs**
Initial Water Level (ft btoc) -	**28.42**
Initial Totalizer Reading (gal) -	**0**
Final Totalizer Reading (gal) -	**1521.46**
Approx. Injected Volume (gal) -	**1521.46**
Calculated Volume Injected (gal) -	**1520.32**
Actual vs. Calculated Gallons Injected -	**1.14**
Number of Specific Capacity Steps -	**2**
Injection Rates (List In Order) -	**5 and 7.5 GPM Respectfully**

Step 2					
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)
7:20:00	0.00	0.00	0.00	28.42	0.00
7:20:20	0.33	6.02	2.01	27.70	0.72
7:20:40	0.67	4.12	3.38	27.61	0.81
7:21:00	1.00	5.10	5.08	27.36	1.06
7:22:00	2.00	5.08	10.16	26.36	2.06
7:23:00	3.00	5.08	15.24	25.77	2.65
7:24:00	4.00	5.08	20.32	25.36	3.06
7:25:00	5.00	5.08	25.40	25.09	3.33
7:26:00	6.00	5.08	30.48	24.89	3.53
7:27:00	7.00	5.10	35.58	24.75	3.67
7:28:00	8.00	5.08	40.66	24.62	3.80
7:29:00	9.00	5.10	45.76	24.52	3.90
7:30:00	10.00	5.10	50.86	24.44	3.98
7:32:00	12.00	5.10	61.06	24.29	4.13
7:34:00	14.00	5.10	71.26	24.15	4.27
7:36:00	16.00	5.10	81.46	24.06	4.36
7:38:00	18.00	5.08	91.62	24.01	4.41
7:40:00	20.00	5.10	101.82	23.93	4.49
7:42:00	22.00	5.10	112.02	23.89	4.53
7:44:00	24.00	5.10	122.22	23.85	4.57
7:46:00	26.00	5.12	132.46	23.83	4.59
7:48:00	28.00	5.10	142.66	23.75	4.67
7:50:00	30.00	5.12	152.90	23.76	4.66
7:55:00	35.00	5.12	178.50	23.67	4.75
8:00:00	40.00	5.12	204.10	23.62	4.80
8:05:00	45.00	5.12	229.70	23.59	4.83
8:10:00	50.00	5.12	255.30	23.54	4.88
8:15:00	55.00	5.12	280.90	23.50	4.92
8:20:00	60.00	5.12	306.50	23.48	4.94
8:30:00	70.00	5.12	357.70	23.40	5.02
8:40:00	80.00	5.12	408.90	23.36	5.06
8:50:00	90.00	5.12	460.10	23.29	5.13
9:00:00	100.00	5.12	511.30	23.28	5.14
9:10:00	110.00	5.12	562.50	23.25	5.17
9:20:00	120.00	5.12	613.70	23.21	5.21

Total Volume Injected During Step (GAL):	613.70
Average Injection Rate (GPM):	5.10
Specific Injectivity (GPM/FT):	0.98

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	**IRZ-39**
Date -	**11/7/2019**
Screened Interval -	**28'-39' bgs**
Injection Water Source -	**Fresh water from construction water supply system**
Injection Outlet Depth -	**40 ft. bgs**
Initial Water Level (ft btoc) -	**28.42**
Initial Totalizer Reading (gal) -	**0**
Final Totalizer Reading (gal) -	**1521.46**
Approx. Injected Volume (gal) -	**1521.46**
Calculated Volume Injected (gal) -	**1520.32**
Actual vs. Calculated Gallons Injected -	**1.14**
Number of Specific Capacity Steps -	**2**
Injection Rates (List In Order) -	**5 and 7.5 GPM Respectfully**

Step 3						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 2 Start (Min)
9:20:20	120.33	7.26	616.12	23.00	5.42	0.00
9:20:40	120.67	7.53	618.63	22.76	5.66	0.33
9:21:00	121.00	7.52	621.14	22.51	5.91	0.67
9:22:00	122.00	7.52	628.66	22.10	6.32	1.67
9:23:00	123.00	7.50	636.16	21.85	6.57	2.67
9:24:00	124.00	7.39	643.55	21.70	6.72	3.67
9:25:00	125.00	7.60	651.15	21.59	6.83	4.67
9:26:00	126.00	7.59	658.74	21.46	6.96	5.67
9:27:00	127.00	7.58	666.32	21.40	7.02	6.67
9:28:00	128.00	7.56	673.88	21.34	7.08	7.67
9:29:00	129.00	7.58	681.46	21.29	7.13	8.67
9:30:00	130.00	7.58	689.04	21.25	7.17	9.67
9:32:00	132.00	7.58	704.20	21.18	7.24	11.67
9:34:00	134.00	7.56	719.32	21.15	7.27	13.67
9:36:00	136.00	7.56	734.44	21.11	7.31	15.67
9:38:00	138.00	7.56	749.56	21.06	7.36	17.67
9:40:00	140.00	7.56	764.68	21.03	7.39	19.67
9:42:00	142.00	7.56	779.80	20.99	7.43	21.67
9:44:00	144.00	7.56	794.92	20.98	7.44	23.67
9:46:00	146.00	7.58	810.08	20.96	7.46	25.67
9:48:00	148.00	7.56	825.20	20.94	7.48	27.67
9:50:00	150.00	7.56	840.32	20.93	7.49	29.67
9:55:00	155.00	7.56	878.12	20.85	7.57	34.67
10:00:00	160.00	7.58	916.02	20.83	7.59	39.67
10:05:00	165.00	7.56	953.82	20.81	7.61	44.67
10:10:00	170.00	7.58	991.72	20.75	7.67	49.67
10:15:00	175.00	7.56	1029.52	20.76	7.66	54.67
10:20:00	180.00	7.56	1067.32	20.72	7.70	59.67
10:30:00	190.00	7.56	1142.92	20.67	7.75	69.67
10:40:00	200.00	7.56	1218.52	20.62	7.80	79.67
10:50:00	210.00	7.54	1293.92	20.58	7.84	89.67
11:00:00	220.00	7.54	1369.32	20.55	7.87	99.67
11:10:00	230.00	7.56	1444.92	20.49	7.93	109.67
11:20:00	240.00	7.54	1520.32	20.48	7.94	119.67

Total Volume Injected During Step (GAL):	906.62
Average Injection Rate (GPM):	7.55
Specific Injectivity (GPM/FT):	0.95

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	IRZ-39
Date -	11/12/2019
Screened Interval -	28'-39' bgs
Injection Water Source -	Fresh water from construction water supply system
Injection Outlet Depth -	40 ft. bgs
Initial Water Level (ft btoc) -	28.51
Initial Totalizer Reading (gal) -	0
Final Totalizer Reading (gal) -	3326.62
Approx. Injected Volume (gal) -	3326.62
Calculated Volume Injected (gal) -	3327.88
Actual vs. Calculated Gallons Injected -	1.26
Number of Specific Capacity Steps -	2
Injection Rates (List In Order) -	10 and 15 GPM Respectfully

Step 4					
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)
9:30:00	0.00	0.00	0.00	28.13	0.00
9:30:20	0.33	28.62	9.54	27.35	1.16
9:30:40	0.67	21.84	16.82	23.71	4.80
9:31:00	1.00	5.28	18.58	24.55	3.96
9:32:00	2.00	10.18	28.76	23.51	5.00
9:33:00	3.00	10.02	38.78	22.50	6.01
9:34:00	4.00	10.04	48.82	22.01	6.50
9:35:00	5.00	10.02	58.84	21.59	6.92
9:36:00	6.00	10.01	68.85	21.24	7.27
9:37:00	7.00	10.04	78.89	20.94	7.57
9:38:00	8.00	10.04	88.93	20.71	7.80
9:39:00	9.00	10.18	99.11	20.49	8.02
9:40:00	10.00	10.02	109.13	20.38	8.13
9:42:00	12.00	10.04	129.21	20.08	8.43
9:44:00	14.00	10.01	149.23	19.85	8.66
9:46:00	16.00	10.08	169.39	19.69	8.82
9:48:00	18.00	10.10	189.59	19.54	8.97
9:50:00	20.00	10.01	209.61	19.39	9.12
9:52:00	22.00	9.98	229.57	19.33	9.18
9:54:00	24.00	10.06	249.69	19.25	9.26
9:56:00	26.00	9.98	269.65	19.17	9.34
9:58:00	28.00	9.96	289.57	19.09	9.42
10:00:00	30.00	10.07	309.71	19.01	9.50
10:05:00	35.00	10.01	359.76	18.80	9.71
10:10:00	40.00	10.02	409.86	18.69	9.82
10:15:00	45.00	10.06	460.16	18.59	9.92
10:20:00	50.00	10.07	510.51	18.50	10.01
10:25:00	55.00	9.96	560.31	18.38	10.13
10:30:00	60.00	10.00	610.31	18.31	10.20
10:40:00	70.00	9.98	710.11	18.21	10.30
10:50:00	80.00	10.13	811.41	18.04	10.47
11:00:00	90.00	10.08	912.21	17.88	10.63
11:10:00	100.00	10.13	1013.51	17.74	10.77
11:20:00	110.00	10.10	1114.51	17.65	10.86
11:30:00	120.00	10.12	1215.71	17.57	10.94
11:40:00	130.00	10.20	1317.71	17.47	11.04
11:50:00	140.00	10.20	1419.71	17.37	11.14
12:00:00	150.00	10.13	1521.01	17.31	11.20

Total Volume Injected During Step (GAL):	1521.01
Average Injection Rate (GPM):	10.75
Specific Injectivity (GPM/FT):	0.96

ARCADIS Design & Consultancy for natural and built assets

Injectivity Testing

Location/Well ID-	IRZ-39
Date -	11/12/2019
Screened Interval -	28'-39' bgs
Injection Water Source -	Fresh water from construction water supply system
Injection Outlet Depth -	40 ft. bgs
Initial Water Level (ft btoc) -	28.51
Initial Totalizer Reading (gal) -	0
Final Totalizer Reading (gal) -	3326.62
Approx. Injected Volume (gal) -	3326.62
Calculated Volume Injected (gal) -	3327.88
Actual vs. Calculated Gallons Injected -	1.26
Number of Specific Capacity Steps -	2
Injection Rates (List In Order) -	10 and 15 GPM Respectfully

Step 5						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 2 Start (Min)
12:00:20	150.33	19.17	1527.40	16.30	12.21	0.00
12:00:40	150.67	14.54	1532.25	15.86	12.65	0.33
12:01:00	151.00	15.22	1537.32	15.49	13.02	0.67
12:02:00	152.00	14.98	1552.30	14.68	13.83	1.67
12:03:00	153.00	14.96	1567.26	14.11	14.40	2.67
12:04:00	154.00	15.23	1582.49	13.80	14.71	3.67
12:05:00	155.00	14.98	1597.47	13.59	14.92	4.67
12:06:00	156.00	15.09	1612.56	13.44	15.07	5.67
12:07:00	157.00	15.08	1627.64	13.35	15.16	6.67
12:08:00	158.00	15.06	1642.70	13.24	15.27	7.67
12:09:00	159.00	15.09	1657.79	13.15	15.36	8.67
12:10:00	160.00	15.12	1672.91	13.02	15.49	9.67
12:12:00	162.00	15.10	1703.11	12.95	15.56	11.67
12:14:00	164.00	15.08	1733.27	12.83	15.68	13.67
12:16:00	166.00	15.08	1763.43	12.77	15.74	15.67
12:18:00	168.00	15.09	1793.61	12.71	15.80	17.67
12:20:00	170.00	15.06	1823.73	12.67	15.84	19.67
12:22:00	172.00	15.16	1854.05	12.60	15.91	21.67
12:24:00	174.00	15.09	1884.23	12.58	15.93	23.67
12:26:00	176.00	15.08	1914.39	12.52	15.99	25.67
12:28:00	178.00	15.08	1944.55	12.50	16.01	27.67
12:30:00	180.00	15.09	1974.73	12.47	16.04	29.67
12:35:00	185.00	15.08	2050.13	12.37	16.14	34.67
12:40:00	190.00	15.06	2125.43	12.31	16.20	39.67
12:45:00	195.00	15.08	2200.83	12.25	16.26	44.67
12:50:00	200.00	15.04	2276.03	12.21	16.30	49.67
12:55:00	205.00	15.12	2351.63	12.15	16.36	54.67
13:00:00	210.00	14.87	2425.98	12.18	16.33	59.67
13:10:00	220.00	15.30	2578.98	11.95	16.56	69.67
13:20:00	230.00	15.02	2729.18	11.99	16.52	79.67
13:30:00	240.00	14.87	2877.88	12.00	16.51	89.67
13:40:00	250.00	15.02	3028.08	11.84	16.67	99.67
13:50:00	260.00	14.98	3177.88	11.79	16.72	109.67
14:00:00	270.00	15.00	3327.88	11.77	16.74	119.67

Total Volume Injected During Step (GAL):	1806.87
Average Injection Rate (GPM):	15.17
Specific Injectivity (GPM/FT):	0.91

IRZ-39 (Step 1) Linear Change in Water Level Plot
Legend
Transducer
Manual
Recovery Data
Step 1:
Total Volume Injected: 301.49 gal
Avg. Injection Rate: 2.54 gpm
Change in Water Level in IRZ-39: 2.36 ft
Specific Injectivity: 1.08 gpm/ft
Change in Water Level (feet)
Elapsed Time (min)
0
1
1
2
2
3
3
0
20
40
60
80
100
120
140
160
180

IRZ-39 (Step 1) Semi-Log Linear Change in Water Level Plot
Legend
Transducer
Manual
Step 1:
Total Volume Injected: 301.49 gal
Avg. Injection Rate: 2.54 gpm
Change in Water Level in IRZ-39: 2.36 ft
Specific Injectivity: 1.08 gpm/ft
Recovery Data
Change in Water Level (feet)
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0.01
0.10
1.00
10.00
100.00
Elapsed Time (min)

IRZ-39 (Step 2 and Step 3) Linear Change in Water Level Plot
Change in Water Level (feet)
Elapsed Time (min)
0
1
2
3
4
5
6
7
8
9
0
50
100
150
200
250
300
Legend
Transducer
Manual
Step 3:
Total Volume Injected: 906.62 gal
Avg. Injection Rate: 7.55 gpm
Change in Water Level in IRZ-39: 7.94 ft
Specific Injectivity: 0.95 gpm/ft
Recovery Data
Step 2:
Total Volume Injected: 613.70 gal
Avg. Injection Rate: 5.10 gpm
Change in Water Level in IRZ-39: 5.21 ft
Specific Injectivity: 0.98 gpm/ft

IRZ-39 (Step 2 and Step 3)
Semi-Log Linear Change in Water Level Plot

IRZ-39 (Step 4 and Step 5) Linear Change in Water Level Plot
Change in Water Level (feet)
Elapsed Time (min)
0
2
4
6
8
10
12
14
16
18
0
50
100
150
200
250
300
350
Legend
Transducer
Manual
Flow rate fluctuated due to refilling fresh water tank
Flow rate fluctuated due to refilling fresh water tank
Step 5:
Total Volume Injected: 1806.87 gal
Avg. Injection Rate: 15.17 gpm
Change in Water Level in IRZ-39: 16.74 ft
Specific Injectivity: 0.91 gpm/ft
Recovery Data
Step 4:
Total Volume Injected: 1521.01 gal
Avg. Injection Rate: 10.75 gpm
Change in Water Level in IRZ-39: 11.2 ft
Specific Injectivity: 0.96 gpm/ft
Inconsistent initial pumping rate

IRZ-39 (Step 4 and Step 5)
Semi-Log Linear Change in Water Level Plot

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID- **MW-12**

Well being tested- **IRZ-39**

Screened Interval of well being tested - **28'-39' bgs**

Date	Time	Date+Time	Depth to Water
11/4/19	12:15	11/4/19 12:15	28.77
11/5/19	7:57	11/5/19 7:57	28.86
11/5/19	9:07	11/5/19 9:07	28.87
11/5/19	9:43	11/5/19 9:43	28.86
11/5/19	12:14	11/5/19 12:14	28.85
11/5/19	13:01	11/5/19 13:01	28.80
11/5/19	14:02	11/5/19 14:02	28.76
11/5/19	15:03	11/5/19 15:03	28.80
11/5/19	15:49	11/5/19 15:49	28.80
11/5/19	16:35	11/5/19 16:35	28.80
11/6/19	7:27	11/6/19 7:27	28.88
11/6/19	9:43	11/6/19 9:43	28.84
11/6/19	11:45	11/6/19 11:45	28.81
11/6/19	13:18	11/6/19 13:18	28.80
11/6/19	14:20	11/6/19 14:20	28.80
11/6/19	15:13	11/6/19 15:13	28.80
11/6/19	15:34	11/6/19 15:34	28.80
11/7/19	7:06	11/7/19 7:06	28.92
11/7/19	7:51	11/7/19 7:51	28.92
11/7/19	8:45	11/7/19 8:45	28.92
11/7/19	9:51	11/7/19 9:51	28.90
11/7/19	10:43	11/7/19 10:43	28.89
11/7/19	11:11	11/7/19 11:11	28.89
11/7/19	11:51	11/7/19 11:51	28.89
11/12/19	9:02	11/12/19 9:02	28.99
11/12/19	10:01	11/12/19 10:01	28.96
11/12/19	11:52	11/12/19 11:52	28.91
11/12/19	12:36	11/12/19 12:36	28.88
11/12/19	13:51	11/12/19 13:51	28.85
11/12/19	14:45	11/12/19 14:45	28.85

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID- **MW-71-035**

Well being tested- **IRZ-39**

Screened Interval of well being tested - **28'-39' bgs**

Date	Time	Date+Time	Depth to Water
11/4/19	11:45	11/4/19 11:45	28.47
11/5/19	8:00	11/5/19 8:00	28.51
11/5/19	9:03	11/5/19 9:03	28.51
11/5/19	9:46	11/5/19 9:46	28.52
11/5/19	12:06	11/5/19 12:06	28.52
11/5/19	13:05	11/5/19 13:05	28.52
11/5/19	14:00	11/5/19 14:00	28.52
11/5/19	15:07	11/5/19 15:07	28.53
11/5/19	15:47	11/5/19 15:47	28.51
11/5/19	16:35	11/5/19 16:35	28.52
11/6/19	7:31	11/6/19 7:31	28.53
11/6/19	9:40	11/6/19 9:40	28.54
11/6/19	11:48	11/6/19 11:48	28.54
11/6/19	13:15	11/6/19 13:15	28.55
11/6/19	14:23	11/6/19 14:23	28.55
11/6/19	15:08	11/6/19 15:08	28.54
11/6/19	15:40	11/6/19 15:40	28.54
11/7/19	7:00	11/7/19 7:00	28.58
11/7/19	7:54	11/7/19 7:54	28.54
11/7/19	8:43	11/7/19 8:43	28.60
11/7/19	9:54	11/7/19 9:54	28.60
11/7/19	10:40	11/7/19 10:40	28.60
11/7/19	11:13	11/7/19 11:13	28.59
11/7/19	11:47	11/7/19 11:47	28.59
11/12/19	8:59	11/12/19 8:59	28.62
11/12/19	10:03	11/12/19 10:03	28.62
11/12/19	11:54	11/12/19 11:54	28.62
11/12/19	12:33	11/12/19 12:33	28.61
11/12/19	13:54	11/12/19 13:54	28.60
11/12/19	14:44	11/12/19 14:44	28.59

MW-12 Water Level During IRZ-39 Injectivity Test
Step 1
Step 2, 3
Step 4, 5
Distance to IRZ-39: ~190 Feet
Legend
Transducer
Manual
Step 4:
Total Volume Injected: 1521.01 gal
Avg. Injection Rate: 10.75 gpm
Change in Water Level in IRZ-39: 11.2 ft
Specific Injectivity: 0.96 gpm/ft
Step 5:
Total Volume Injected: 1806.87 gal
Avg. Injection Rate: 15.17 gpm
Change in Water Level in IRZ-39: 16.74 ft
Specific Injectivity: 0.91 gpm/ft
Step 2:
Total Volume Injected: 613.70 gal
Avg. Injection Rate: 5.10 gpm
Change in Water Level in IRZ-39: 5.21 ft
Specific Injectivity: 0.98 gpm/ft
Step 1:
Total Volume Injected: 301.49 gal
Avg. Injection Rate: 2.54 gpm
Change in Water Level in IRZ-39: 2.36 ft
Specific Injectivity: 1.08 gpm/ft
Step 3:
Total Volume Injected: 906.62 gal
Avg. Injection Rate: 7.55 gpm
Change in Water Level in IRZ-39: 7.94 ft
Specific Injectivity: 0.95 gpm/ft
Transducer data show little to no change in water level readings compaired to manual water level readings
Depth to Water (feet)
28.6
28.7
28.8
28.9
29.0
29.1
29.2
11/6/2019
11/7/2019
11/8/2019
11/9/2019
11/10/2019
11/11/2019
11/12/2019
11/13/2019
Date

MW-12 Water Level During Step 1 of The IRZ-39 Injectivity Test
Step 1
Distance to IRZ-39: ~190 Feet
Legend
Transducer
Manual
Depth to Water (feet)
28.5
28.6
28.7
28.8
28.9
29.0
29.1
29.2
11/6/19 6:00
11/6/19 9:00
11/6/19 12:00
11/6/19 15:00
11/6/19 18:00
Date and Time
Transducer data show little to no change in water level readings compaired to manual water level readings
Step 1:
Total Volume Injected: 301.49 gal
Avg. Injection Rate: 2.54 gpm
Change in Water Level in IRZ-39: 2.36 ft
Specific Injectivity: 1.08 gpm/ft

MW-12 Water Level During Step 2 and Step 3 of The IRZ-39 Injectivity Test
Step 2
Step 3
Distance to IRZ-39: ~190 Feet
Legend
Transducer
Manual
Depth to Water (feet)
28.5
28.6
28.7
28.8
28.9
29.0
29.1
29.2
11/7/19 6:00
11/7/19 9:00
11/7/19 12:00
11/7/19 15:00
Date and Time
Step 2:
Total Volume Injected: 613.70 gal
Avg. Injection Rate: 5.10 gpm
Change in Water Level in IRZ-39: 5.21 ft
Specific Injectivity: 0.98 gpm/ft
Step 3:
Total Volume Injected: 906.62 gal
Avg. Injection Rate: 7.55 gpm
Change in Water Level in IRZ-39: 7.94 ft
Specific Injectivity: 0.95 gpm/ft
Transducer data show little to no change in water level readings compaired to manual water level readings

MW-12 Water Level During Step 4 and Step 5 of The IRZ-39 Injectivity Test
Step 4
Step 5
Distance to IRZ-39: ~190 Feet
Legend
Transducer
Manual
Clean Harbors filled construction water tank up
Clean Harbors filled construction water tank up
Step 4:
Total Volume Injected: 1521.01 gal
Avg. Injection Rate: 10.75 gpm
Change in Water Level in IRZ-39: 11.2 ft
Specific Injectivity: 0.96 gpm/ft
Step 5:
Total Volume Injected: 1806.87 gal
Avg. Injection Rate: 15.17 gpm
Change in Water Level in IRZ-39: 16.74 ft
Specific Injectivity: 0.91 gpm/ft
Transducer data show little to no change in water level readings compaired to manual water level readings
Depth to Water (feet)
28.6
28.7
28.8
28.9
29.0
29.1
29.2
11/12/19 6:00
11/12/19 9:00
11/12/19 12:00
11/12/19 15:00
11/12/19 18:00
Date and Time

MW-71-35 Water Level During IRZ-39 Injectivity Test
Step 1
Step 2, 3
Step 4, 5
Distance to IRZ-39: ~80 Feet
Legend
Transducer
Manual
Step 4:
Total Volume Injected: 1521.01 gal
Avg. Injection Rate: 10.75 gpm
Change in Water Level in IRZ-39: 11.2 ft
Specific Injectivity: 0.96 gpm/ft
Step 5:
Total Volume Injected: 1806.87 gal
Avg. Injection Rate: 15.17 gpm
Change in Water Level in IRZ-39: 16.74 ft
Specific Injectivity: 0.91 gpm/ft
Step 2:
Total Volume Injected: 613.70 gal
Avg. Injection Rate: 5.10 gpm
Change in Water Level in IRZ-39: 5.21 ft
Specific Injectivity: 0.98 gpm/ft
Transducer shift
Step 1:
Total Volume Injected: 301.49 gal
Avg. Injection Rate: 2.54 gpm
Change in Water Level in IRZ-39: 2.36 ft
Specific Injectivity: 1.08 gpm/ft
Step 3:
Total Volume Injected: 906.62 gal
Avg. Injection Rate: 7.55 gpm
Change in Water Level in IRZ-39: 7.94 ft
Specific Injectivity: 0.95 gpm/ft
Transducer data show little to no change in water level readings compaired to manual water level readings
Depth to Water (feet)
28.0
28.1
28.2
28.3
28.4
28.5
28.6
28.7
28.8
28.9
29.0
11/6/2019
11/7/2019
11/8/2019
11/9/2019
11/10/2019
11/11/2019
11/12/2019
11/13/2019
Date and Time

MW-71-35 Water Level During Steps 1 of The IRZ-39 Injectivity Test
Step 1
Distance to IRZ-39: ~80 Feet
Legend
Transducer
Manual
Depth to Water (feet)
28.2
28.3
28.4
28.5
28.6
28.7
28.8
28.9
11/6/19 6:00
11/6/19 9:00
11/6/19 12:00
11/6/19 15:00
11/6/19 18:00
Date and Time
Transducer data show little to no change in water level readings compaired to manual water level readings
Step 1:
Total Volume Injected: 301.49 gal
Avg. Injection Rate: 2.54 gpm
Change in Water Level in IRZ-39: 2.36 ft
Specific Injectivity: 1.08 gpm/ft

MW-71-35 Water Level During Step 2 and Step 3 of The IRZ-39 Injectivity Test
Step 2
Step 3
Distance to IRZ-39: ~80 Feet
Legend
Transducer
Manual
Depth to Water (feet)
28.3
28.4
28.4
28.5
28.5
28.6
28.6
28.7
28.7
28.8
28.8
Step 2:
Total Volume Injected: 613.70 gal
Avg. Injection Rate: 5.10 gpm
Change in Water Level in IRZ-39: 5.21 ft
Specific Injectivity: 0.98 gpm/ft
Step 3:
Total Volume Injected: 906.62 gal
Avg. Injection Rate: 7.55 gpm
Change in Water Level in IRZ-39: 7.94 ft
Specific Injectivity: 0.95 gpm/ft
Transducer data show little to no change in water level readings compaired to manual water level readings
11/7/19 6:00
11/7/19 9:00
11/7/19 12:00
11/7/19 15:00
Date and Time

MW-71-35 Water Level During Step 4 and Step 5 of The IRZ-39 Injectivity Test
Step 4
Step 5
Distance to IRZ-39: ~80 Feet
Legend
Transducer
Manual
Clean Harbors filled construction water tank up
Clean Harbors filled construction water tank up
Transducer shift
Step 4:
Total Volume Injected: 1521.01 gal
Avg. Injection Rate: 10.75 gpm
Change in Water Level in IRZ-39: 11.2 ft
Specific Injectivity: 0.96 gpm/ft
Step 5:
Total Volume Injected: 1806.87 gal
Avg. Injection Rate: 15.17 gpm
Change in Water Level in IRZ-39: 16.74 ft
Specific Injectivity: 0.91 gpm/ft
Transducer data show little to no change in water level readings compaired to manual water level readings
Depth to Water (feet)
28.3
28.4
28.4
28.5
28.5
28.6
28.6
28.7
28.7
28.8
28.8
11/12/19 6:00
11/12/19 9:00
11/12/19 12:00
11/12/19 15:00
11/12/19 18:00
Date and Time

Specific Capacity Testing

Location/Well ID	**RB-4**
Date	**1/9/2020**
Screened Interval Tested	**Upper (28 to 58 ft bgs)**
Packer Set Depth	**71 to 75 ft btoc**
Packer Seal Test	Confirmed packer to be watertight before test
Tests Conducted	Four-step specific capacity test (7.5, 15, 22.5, and 30 gpm, respectively)
Purpose	Well performance test
Summary	Specific capacity: 13.77 to 15.47 gpm/ft
Notes	Inconsisent pumping at start of Step 1
	IM3 Shut off at ~8:06 (before start of test), back on at ~9:08 (during Step 1)
	Flow meter malfunction during Step 4; adjust flow rate at 14:28
	Possible tranducer data drift starting during Step 2 until the end of test
Oversight Signature	
Date	1/22/2020

Acronyms & Abbreviations

bgs = below ground surface

btoc = below top of casing

ft = feet

gpm = gallons per minute

IM = interim measure

Specific Capacity Testing

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	RB-4 (Upper)
Date	1/9/2020
Screened Interval	28 to 58 ft bgs
Pump Depth (ft btoc)	57.00
Packer Depth (ft btoc)	71.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 28 to 58 ft btoc	13.62
Initial Water Level Within 83 to 138 ft btoc	13.65
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	9055.00
Approx Pumped Volume (gal)	9055.00
Calculated Volume Purged (gal)	9053.36
Difference in Volume Pumped vs. Calculated	1.64
Number of Specific Capacity Steps	4
Pumping Rates (in order)	7.5, 15, 22.5, and 30 gpm

Step 1 - Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time (min)	Pumping Rate (gpm)	Total Volume Pumped (gal)	Depth to Water (ft)	Drawdown (ft)
8:10:00	0	0	0.00	0.00	13.88	0.26
8:10:20	0.3	0.33	14.63	4.88	14.20	0.58
8:10:40	0.3	0.67	6.64	7.09	14.05	0.43
8:11:00	0.3	1.00	6.59	9.29	14.02	0.40
8:12:00	1.0	2.00	8.06	17.35	14.10	0.48
8:13:00	1.0	3.00	7.76	25.11	14.10	0.48
8:14:00	1.0	4.00	7.82	32.93	14.10	0.48
8:15:00	1.0	5.00	7.83	40.76	14.10	0.48
8:16:00	1.0	6.00	7.86	48.62	14.09	0.47
8:17:00	1.0	7.00	7.82	56.44	14.09	0.47
8:18:00	1.0	8.00	7.82	64.26	14.09	0.47
8:19:00	1.0	9.00	7.72	71.98	14.09	0.47
8:20:00	1.0	10.00	7.68	79.66	14.09	0.47
8:21:00	1.0	11.00	7.67	87.33	14.09	0.47
8:22:00	1.0	12.00	7.64	94.97	14.09	0.47
8:26:00	4.0	16.00	7.58	125.29	14.08	0.46
8:28:00	2.0	18.00	7.57	140.43	14.08	0.46
8:30:00	2.0	20.00	7.55	155.53	14.08	0.46
8:32:00	2.0	22.00	7.55	170.63	14.08	0.46
8:34:00	2.0	24.00	7.54	185.71	14.08	0.46
8:36:00	2.0	26.00	7.52	200.75	14.08	0.46
8:38:00	2.0	28.00	7.50	215.75	14.08	0.46
8:40:00	2.0	30.00	7.52	230.79	14.08	0.46
8:45:00	5.0	35.00	7.55	268.54	14.08	0.46
8:50:00	5.0	40.00	7.54	306.24	14.08	0.46
8:55:00	5.0	45.00	7.52	343.84	14.08	0.46

Specific Capacity Testing

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	RB-4 (Upper)
Date	1/9/2020
Screened Interval	28 to 58 ft bgs
Pump Depth (ft btoc)	57.00
Packer Depth (ft btoc)	71.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 28 to 58 ft btoc	13.62
Initial Water Level Within 83 to 138 ft btoc	13.65
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	9055.00
Approx Pumped Volume (gal)	9055.00
Calculated Volume Purged (gal)	9053.36
Difference in Volume Pumped vs. Calculated	1.64
Number of Specific Capacity Steps	4
Pumping Rates (in order)	7.5, 15, 22.5, and 30 gpm

9:00:00	5.0	50.00	7.50	381.34	14.08	0.46
9:05:00	5.0	55.00	7.50	418.84	14.08	0.46
9:10:00	5.0	60.00	7.48	456.24	14.10	0.48
9:20:00	10.0	70.00	7.50	531.24	14.14	0.52
9:30:00	10.0	80.00	7.50	606.24	14.14	0.52
9:40:00	10.0	90.00	7.50	681.24	14.15	0.53
9:50:00	10.0	100.00	7.50	756.24	14.15	0.53
10:00:00	10.0	110.00	7.50	831.24	14.17	0.55
10:10:00	10.0	120.00	7.50	906.24	14.18	0.56

Total Volume Pumped for Step 1 (gal)	**906.24**
Average Pumping Rate (gpm)	**7.76**
Specific Capacity (gpm/ft)	**13.86**

Step 2 - Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time from Test Start (min)	Pumping Rate (gpm)	Total Volume Pumped (gal)	Depth to Water (ft)	Drawdown (ft)	Elapsed Time from Step 2 Start (min)
10:10:20	0.33	120.33	13.06	910.59	14.43	0.81	0.33
10:10:40	0.33	120.67	14.43	915.40	14.58	0.96	0.67
10:11:00	0.33	121.00	16.12	920.77	14.63	1.01	1.00
10:12:00	1.00	122.00	15.12	935.89	14.60	0.98	2.00
10:13:00	1.00	123.00	15.14	951.03	14.60	0.98	3.00
10:14:00	1.00	124.00	15.22	966.25	14.60	0.98	4.00
10:15:00	1.00	125.00	15.22	981.47	14.60	0.98	5.00
10:16:00	1.00	126.00	15.21	996.68	14.61	0.99	6.00
10:17:00	1.00	127.00	15.16	1011.84	14.61	0.99	7.00
10:18:00	1.00	128.00	15.18	1027.02	14.61	0.99	8.00
10:19:00	1.00	129.00	15.16	1042.18	14.61	0.99	9.00
10:20:00	1.00	130.00	15.18	1057.36	14.61	0.99	10.00
10:22:00	2.00	132.00	15.19	1087.74	14.61	0.99	12.00
10:24:00	2.00	134.00	15.19	1118.12	14.61	0.99	14.00

Specific Capacity Testing

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	RB-4 (Upper)
Date	1/9/2020
Screened Interval	28 to 58 ft bgs
Pump Depth (ft btoc)	57.00
Packer Depth (ft btoc)	71.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 28 to 58 ft btoc	13.62
Initial Water Level Within 83 to 138 ft btoc	13.65
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	9055.00
Approx Pumped Volume (gal)	9055.00
Calculated Volume Purged (gal)	9053.36
Difference in Volume Pumped vs. Calculated	1.64
Number of Specific Capacity Steps	4
Pumping Rates (in order)	7.5, 15, 22.5, and 30 gpm

10:26:00	2.00	136.00	15.19	1148.50	14.62	1.00	16.00
10:28:00	2.00	138.00	15.21	1178.92	14.62	1.00	18.00
10:30:00	2.00	140.00	15.19	1209.30	14.62	1.00	20.00
10:32:00	2.00	142.00	15.18	1239.66	14.63	1.01	22.00
10:34:00	2.00	144.00	15.19	1270.04	14.63	1.01	24.00
10:36:00	2.00	146.00	15.18	1300.40	14.63	1.01	26.00
10:38:00	2.00	148.00	15.19	1330.78	14.63	1.01	28.00
10:40:00	2.00	150.00	15.19	1361.16	14.63	1.01	30.00
10:45:00	5.00	155.00	15.21	1437.21	14.64	1.02	35.00
10:50:00	5.00	160.00	15.22	1513.31	14.64	1.02	40.00
10:55:00	5.00	165.00	15.24	1589.51	14.64	1.02	45.00
11:00:00	5.00	170.00	15.22	1665.61	14.64	1.02	50.00
11:05:00	5.00	175.00	15.24	1741.81	14.64	1.02	55.00
11:10:00	5.00	180.00	15.24	1818.01	14.65	1.03	60.00
11:20:00	10.00	190.00	15.26	1970.61	14.67	1.05	70.00
11:30:00	10.00	200.00	15.24	2123.01	14.67	1.05	80.00
11:40:00	10.00	210.00	15.28	2275.81	14.68	1.06	90.00
11:50:00	10.00	220.00	15.24	2428.21	14.70	1.08	100.00
12:00:00	10.00	230.00	15.26	2580.81	14.70	1.08	110.00
12:10:00	10.00	240.00	15.26	2733.41	14.72	1.10	120.00

Total Volume Pumped for Step 2 (gal)	**1827.18**
Average Pumping Rate (gpm)	**15.15**
Specific Capacity (gpm/ft)	**13.77**

Step 3 - Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time from Test Start (min)	Pumping Rate (gpm)	Total Volume Pumped (gal)	Depth to Water (ft)	Drawdown (ft)	Elapsed Time from Step 3 Start (min)
12:10:20	0.33	240.33	23.11	2741.12	15.05	1.43	0.33
12:10:40	0.33	240.67	23.12	2748.82	15.08	1.46	0.67

Specific Capacity Testing

Location/Well ID	RB-4 (Upper)
Date	1/9/2020
Screened Interval	28 to 58 ft bgs
Pump Depth (ft btoc)	57.00
Packer Depth (ft btoc)	71.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 28 to 58 ft btoc	13.62
Initial Water Level Within 83 to 138 ft btoc	13.65
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	9055.00
Approx Pumped Volume (gal)	9055.00
Calculated Volume Purged (gal)	9053.36
Difference in Volume Pumped vs. Calculated	1.64
Number of Specific Capacity Steps	4
Pumping Rates (in order)	7.5, 15, 22.5, and 30 gpm

12:11:00	0.33	241.00	23.08	2756.52	15.08	1.46	1.00
12:12:00	1.00	242.00	22.84	2779.36	15.08	1.46	2.00
12:13:00	1.00	243.00	22.64	2802.00	15.08	1.46	3.00
12:14:00	1.00	244.00	22.64	2824.64	15.08	1.46	4.00
12:15:00	1.00	245.00	22.62	2847.26	15.08	1.46	5.00
12:16:00	1.00	246.00	22.60	2869.86	15.08	1.46	6.00
12:17:00	1.00	247.00	22.60	2892.46	15.08	1.46	7.00
12:18:00	1.00	248.00	22.60	2915.06	15.08	1.46	8.00
12:19:00	1.00	249.00	22.60	2937.66	15.08	1.46	9.00
12:20:00	1.00	250.00	22.60	2960.26	15.09	1.47	10.00
12:22:00	2.00	252.00	22.62	3005.50	15.09	1.47	12.00
12:24:00	2.00	254.00	22.62	3050.74	15.09	1.47	14.00
12:26:00	2.00	256.00	22.64	3096.02	15.09	1.47	16.00
12:28:00	2.00	258.00	22.62	3141.26	15.09	1.47	18.00
12:30:00	2.00	260.00	22.64	3186.54	15.09	1.47	20.00
12:32:00	2.00	262.00	22.64	3231.82	15.09	1.47	22.00
12:34:00	2.00	264.00	22.62	3277.06	15.10	1.48	24.00
12:36:00	2.00	266.00	22.60	3322.26	15.10	1.48	26.00
12:38:00	2.00	268.00	22.62	3367.50	15.10	1.48	28.00
12:40:00	2.00	270.00	22.64	3412.78	15.10	1.48	30.00
12:45:00	5.00	275.00	22.64	3525.98	15.10	1.48	35.00
12:50:00	5.00	280.00	22.61	3639.03	15.11	1.49	40.00
12:55:00	5.00	285.00	22.60	3752.03	15.11	1.49	45.00
13:00:00	5.00	290.00	22.60	3865.03	15.12	1.50	50.00
13:05:00	5.00	295.00	22.62	3978.13	15.12	1.50	55.00
13:10:00	5.00	300.00	22.71	4091.68	15.12	1.50	60.00
13:20:00	10.00	310.00	22.71	4318.78	15.13	1.51	70.00
13:30:00	10.00	320.00	22.70	4545.78	15.16	1.54	80.00
13:40:00	10.00	330.00	22.71	4772.88	15.15	1.53	90.00
13:50:00	10.00	340.00	22.71	4999.98	15.19	1.57	100.00

Specific Capacity Testing

Location/Well ID	RB-4 (Upper)
Date	1/9/2020
Screened Interval	28 to 58 ft bgs
Pump Depth (ft btoc)	57.00
Packer Depth (ft btoc)	71.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 28 to 58 ft btoc	13.62
Initial Water Level Within 83 to 138 ft btoc	13.65
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	9055.00
Approx Pumped Volume (gal)	9055.00
Calculated Volume Purged (gal)	9053.36
Difference in Volume Pumped vs. Calculated	1.64
Number of Specific Capacity Steps	4
Pumping Rates (in order)	7.5, 15, 22.5, and 30 gpm

14:00:00	10.00	350.00	22.71	5227.08	15.18	1.56	110.00
14:10:00	10.00	360.00	22.71	5454.18	15.18	1.56	120.00

Total Volume Pumped for Step 3 (gal)	**2720.76**
Average Pumping Rate (gpm)	**22.69**
Specific Capacity (gpm/ft)	**14.54**

Step 4 - Time (HR:MN:SEC)	Change in Time Between Mmeasurements (min)	Elapsed Time from Test Start (min)	Pumping Rate (gpm)	Total Volume Pumped (gal)	Depth to Water (ft)	Drawdown (ft)	Elapsed Time from Step 4 Start (min)
14:10:20	0.33	360.33	25.08	5462.54	15.38	1.76	0.33
14:10:40	0.33	360.67	29.06	5472.22	15.44	1.82	0.33
14:11:00	0.33	361.00	29.70	5482.12	15.44	1.82	0.67
14:12:00	1.00	362.00	29.97	5512.09	15.50	1.88	1.67
14:13:00	1.00	363.00	29.96	5542.05	15.52	1.90	2.67
14:14:00	1.00	364.00	30.07	5572.12	15.52	1.90	3.67
14:15:00	1.00	365.00	30.07	5602.19	15.53	1.91	4.67
14:16:00	1.00	366.00	30.06	5632.25	15.53	1.91	5.67
14:17:00	1.00	367.00	29.97	5662.22	15.53	1.91	6.67
14:18:00	1.00	368.00	29.97	5692.19	15.53	1.91	7.67
14:19:00	1.00	369.00	29.94	5722.13	15.53	1.91	8.67
14:20:00	1.00	370.00	29.99	5752.12	15.53	1.91	9.67
14:22:00	2.00	372.00	29.96	5812.04	15.54	1.92	11.67
14:24:00	2.00	374.00	29.92	5871.88	15.54	1.92	13.67
14:26:00	2.00	376.00	29.87	5931.62	15.54	1.92	15.67
14:28:00	2.00	378.00	29.49	5990.60	15.54	1.92	17.67
14:30:00	2.00	380.00	29.64	6049.88	15.58	1.96	19.67
14:32:00	2.00	382.00	32.29	6114.46	15.60	1.98	21.67
14:34:00	2.00	384.00	30.00	6174.46	15.50	1.88	23.67
14:36:00	2.00	386.00	30.00	6234.46	15.50	1.88	25.67

Specific Capacity Testing

Location/Well ID	RB-4 (Upper)
Date	1/9/2020
Screened Interval	28 to 58 ft bgs
Pump Depth (ft btoc)	57.00
Packer Depth (ft btoc)	71.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 28 to 58 ft btoc	13.62
Initial Water Level Within 83 to 138 ft btoc	13.65
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	9055.00
Approx Pumped Volume (gal)	9055.00
Calculated Volume Purged (gal)	9053.36
Difference in Volume Pumped vs. Calculated	1.64
Number of Specific Capacity Steps	4
Pumping Rates (in order)	7.5, 15, 22.5, and 30 gpm

14:38:00	2.00	388.00	30.00	6294.46	15.50	1.88	27.67
14:40:00	2.00	390.00	30.00	6354.46	15.50	1.88	29.67
14:45:00	5.00	395.00	30.00	6504.46	15.50	1.88	34.67
14:50:00	5.00	400.00	29.99	6654.41	15.50	1.88	39.67
14:55:00	5.00	405.00	30.02	6804.51	15.50	1.88	44.67
15:00:00	5.00	410.00	30.00	6954.51	15.51	1.89	49.67
15:05:00	5.00	415.00	29.97	7104.36	15.51	1.89	54.67
15:10:00	5.00	420.00	30.02	7254.46	15.51	1.89	59.67
15:20:00	10.00	430.00	30.00	7554.46	15.52	1.90	69.67
15:30:00	10.00	440.00	29.97	7854.16	15.52	1.90	79.67
15:40:00	10.00	450.00	29.97	8153.86	15.54	1.92	89.67
15:50:00	10.00	460.00	29.97	8453.56	15.54	1.92	99.67
16:00:00	10.00	470.00	29.99	8753.46	15.55	1.93	109.67
16:10:00	10.00	480.00	29.99	9053.36	15.55	1.93	119.67

Total Volume Pumped for Step 4 (gal)	**3599.19**
Average Pumping Rate (gpm)	**29.85**
Specific Capacity (gpm/ft)	**15.47**

Acronyms & Abbreviations

bgs = below ground surface
btoc = below top of casing
ft = feet
gal = gallons
gpm = gallons per minute
min = minutes

RB-4 Upper Screen (28 to 58 ft) Linear Drawdown Plot
Step 1:
Total Volume Pumped: 906.24 gal
Avg. Flow Rate: 7.76 gpm
Drawdown: 0.56 ft
Specific Capacity: 13.86 gpm/ft
Step 2:
Total Volume Pumped: 1827.18 gal
Avg. Flow Rate: 15.15 gpm
Drawdown: 1.10 ft
Specific Capacity: 13.77 gpm/ft
Step 3:
Total Volume Pumped: 2720.76 gal
Avg. Flow Rate: 22.69 gpm
Drawdown: 1.56 ft
Specific Capacity: 14.54 gpm/ft
Step 4:
Total Volume Pumped: 3599.19 gal
Avg. Flow Rate: 29.85 gpm
Drawdown: 1.93 ft
Specific Capacity: 15.47 gpm/ft
IM3 start up
Inconsistent Pumping Rate
Possible transducer data drift
Flow meter malfunction, Adjust flow rate.
Recovery
Legend
Transducer
Manual
Drawdown (feet)
Elapsed Time (min)
0
0.5
1
1.5
2
2.5
0
100
200
300
400
500
600
700

RB-4 Upper Screen (28 to 58 ft) Semi-Log Drawdown Plot

Specific Capacity/
Injection Test Monitoring Point

Location/Well ID	**MW-28-025**
Well Being Tested	**RB-4**
Screened Interval of Well Being Tested	**28 to 58 ft bgs**
Approximate Distance from Testing Well	**100 ft**

Date	Time	Date and Time	Depth to Water
1/7/2020	12:53	1/7/20 12:53	14.81
1/8/2020	7:43	1/8/20 7:43	14.60
1/8/2020	8:46	1/8/20 8:46	14.65
1/8/2020	9:57	1/8/20 9:57	14.68
1/8/2020	10:43	1/8/20 10:43	14.73
1/8/2020	11:58	1/8/20 11:58	14.78
1/8/2020	12:42	1/8/20 12:42	14.83
1/8/2020	13:55	1/8/20 13:55	14.87
1/8/2020	14:41	1/8/20 14:41	14.92
1/8/2020	15:58	1/8/20 15:58	14.93
1/8/2020	16:22	1/8/20 16:22	14.92
1/9/2020	7:14	1/9/20 7:14	14.58
1/9/2020	8:43	1/9/20 8:43	14.58
1/9/2020	9:54	1/9/20 9:54	14.63
1/9/2020	10:41	1/9/20 10:41	14.66
1/9/2020	11:57	1/9/20 11:57	14.71
1/9/2020	12:42	1/9/20 12:42	14.76
1/9/2020	13:54	1/9/20 13:54	14.81
1/9/2020	14:42	1/9/20 14:42	14.85
1/9/2020	15:54	1/9/20 15:54	14.90
1/9/2020	16:25	1/9/20 16:25	14.85
1/10/2020	8:28	1/10/20 8:28	14.39

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

Location/Well ID	**MW-28-090**
Well Being Tested	**RB-4**
Screened Interval of Well Being Tested	**28 to 58 ft bgs**
Approximate Distance from Testing Well	**98 ft**

Date	Time	Date and Time	Depth to Water
1/7/2020	12:47	1/7/20 12:47	15.61
1/8/2020	7:42	1/8/20 7:42	15.37
1/8/2020	8:48	1/8/20 8:48	15.60
1/8/2020	9:56	1/8/20 9:56	15.65
1/8/2020	10:42	1/8/20 10:42	15.88
1/8/2020	11:57	1/8/20 11:57	15.93
1/8/2020	12:41	1/8/20 12:41	16.14
1/8/2020	13:54	1/8/20 13:54	16.21
1/8/2020	14:42	1/8/20 14:42	16.43
1/8/2020	15:57	1/8/20 15:57	16.48
1/8/2020	16:23	1/8/20 16:23	15.80
1/9/2020	7:13	1/9/20 7:13	15.34
1/9/2020	8:42	1/9/20 8:42	15.22
1/9/2020	9:53	1/9/20 9:53	15.40
1/9/2020	10:39	1/9/20 10:39	15.44
1/9/2020	11:56	1/9/20 11:56	15.51
1/9/2020	12:41	1/9/20 12:41	15.55
1/9/2020	13:53	1/9/20 13:53	15.60
1/9/2020	14:41	1/9/20 14:41	15.67
1/9/2020	15:54	1/9/20 15:54	15.75
1/9/2020	16:22	1/9/20 16:22	15.68
1/10/2020	8:20	1/10/20 8:20	15.18

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

MW-28-025 During RB-4 Upper Screen (28 to 58 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Distance to RB-4: ~100 Feet
Legend
Transducer
Manual
IM3 Shut off at ~8:06.
IM3 start up at ~9:08
Flow meter malfunction, Adjust flow rate.
Inconsistent Pumping Rate
Depth to Water (feet)
13.5
14.0
14.5
15.0
15.5
16.0
1/9/20 6:00
1/9/20 9:00
1/9/20 12:00
1/9/20 15:00
1/9/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 906.24 gal
Avg. Flow Rate: 7.76 gpm
Drawdown in RB-4: 0.56 ft
Specific Capacity: 13.86 gpm/ft
Step 2:
Total Volume Pumped: 1827.18 gal
Avg. Flow Rate: 15.15 gpm
Drawdown in RB-4: 1.10 ft
Specific Capacity: 13.77 gpm/ft
Step 3:
Total Volume Pumped: 2720.76 gal
Avg. Flow Rate: 22.69 gpm
Drawdown in RB-4: 1.56 ft
Specific Capacity: 14.54 gpm/ft
Step 4:
Total Volume Pumped: 3599.19 gal
Avg. Flow Rate: 29.85 gpm
Drawdown in RB-4: 1.93 ft
Specific Capacity: 15.47 gpm/ft

MW-28-090 During RB-4 Upper Screen (28 to 58 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Distance to RB-4: ~98 Feet
Legend
Transducer
Manual
IM3 Shut off at ~8:06.
IM3 start up at ~9:08
Flow meter malfunction, Adjust flow rate
Inconsistent Pumping Rate
Depth to Water (feet)
14.5
15.0
15.5
16.0
16.5
1/9/20 6:00
1/9/20 9:00
1/9/20 12:00
1/9/20 15:00
1/9/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 906.24 gal
Avg. Flow Rate: 7.76 gpm
Drawdown in RB-4: 0.56 ft
Specific Capacity: 13.86 gpm/ft
Step 2:
Total Volume Pumped: 1827.18 gal
Avg. Flow Rate: 15.15 gpm
Drawdown in RB-4: 1.10 ft
Specific Capacity: 13.77 gpm/ft
Step 3:
Total Volume Pumped: 2720.76 gal
Avg. Flow Rate: 22.69 gpm
Drawdown in RB-4: 1.56 ft
Specific Capacity: 14.54 gpm/ft
Step 4:
Total Volume Pumped: 3599.19 gal
Avg. Flow Rate: 29.85 gpm
Drawdown in RB-4: 1.93 ft
Specific Capacity: 15.47 gpm/ft

MW-46-175 During RB-4 Upper Screen (28 to 58 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Manual water levels not collected during test.
Legend
Transducer
IM3 Shut off at ~8:06.
IM3 start up at ~9:08
Flow meter malfunction, Adjust flow rate
Inconsistent Pumping Rate
Step 1:
Total Volume Pumped: 906.24 gal
Avg. Flow Rate: 7.76 gpm
Drawdown in RB-4: 0.56 ft
Specific Capacity: 13.86 gpm/ft
Step 2:
Total Volume Pumped: 1827.18 gal
Avg. Flow Rate: 15.15 gpm
Drawdown in RB-4: 1.10 ft
Specific Capacity: 13.77 gpm/ft
Step 3:
Total Volume Pumped: 2720.76 gal
Avg. Flow Rate: 22.69 gpm
Drawdown in RB-4: 1.56 ft
Specific Capacity: 14.54 gpm/ft
Step 4:
Total Volume Pumped: 3599.19 gal
Avg. Flow Rate: 29.85 gpm
Drawdown in RB-4: 1.93 ft
Specific Capacity: 15.47 gpm/ft
Level (feet)
37.0
37.5
38.0
38.5
39.0
39.5
1/9/20 6:00
1/9/20 9:00
1/9/20 12:00
1/9/20 15:00
1/9/20 18:00
Date and Time

Specific Capacity Testing

Location/Well ID	**RB-4**
Date	**1/8/2020**
Screened Interval Tested	**Lower (83 to 138 ft bgs)**
Packer Set Depth	**71 to 75 ft btoc**
Packer Seal Test	Confirmed packer to be watertight before test
Tests Conducted	Four-step specific capacity test (25, 50, 75, and 100 gpm, respectively)
Purpose	Well performance test
Summary	Specific capacity: 8.45 to 9.13 gpm/ft
Notes	Changed flow rate at 9:21 from 24 gpm, to 28 gpm for 30 seconds, and stabilized at 25.88 gpm at 9:22
	Changed flow rate at 11:30, flow stabilized at 50.78 gpm at 11:32
	Changed flow rate at 12:55, flow stabilized at 75.38 gpm at 12:56
	Changed flow rate at 13:20, flow stabilized at 75.26 gpm at 13:21
	Changed flow rate at 13:38, flow stabilized at 75.50 gpm
Oversight Signature	
Date	1/22/2020

Acronyms & Abbreviations
bgs = below ground surface
btoc = below top of casing
ft = feet
gpm = gallons per minute

Specific Capacity Test

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	RB-4 (Lower)
Date	1/8/2020
Screened Interval	83 to 138 ft bgs
Pump Depth (ft btoc)	137.00
Packer Depth (ft btoc)	71.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 28 to 58 ft btoc	13.78
Initial Water Level Within 83 to 138 ft btoc	13.74
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	30148.50
Approx Pumped Volume (gal)	30148.50
Calculated Volume Purged (gal)	30127.36
Difference in Volume Pumped vs. Calculated	21.14
Number of Specific Capacity Steps	4
Pumping Rates (in order)	25, 50, 75, 100 gpm

Step 1 - Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time (min)	Pumping Rate (gpm)	Total Volume pumped (gal)	Depth to Water (ft)	Drawdown (ft)
8:10:00	0	0	26.86	0.00	13.76	0.02
8:10:20	0.3	0.33	36.44	12.15	16.90	3.16
8:10:40	0.3	0.67	21.66	19.37	15.92	2.18
8:11:00	0.3	1.00	29.52	29.21	16.40	2.66
8:12:00	1.0	2.00	26.13	55.34	16.36	2.62
8:13:00	1.0	3.00	25.28	80.62	16.36	2.62
8:14:00	1.0	4.00	25.64	106.26	16.43	2.69
8:15:00	1.0	5.00	25.52	131.78	16.43	2.69
8:16:00	1.0	6.00	25.52	157.30	16.43	2.69
8:17:00	1.0	7.00	25.40	182.70	16.44	2.70
8:18:00	1.0	8.00	25.28	207.98	16.44	2.70
8:19:00	1.0	9.00	25.40	233.38	16.45	2.71
8:20:00	1.0	10.00	25.40	258.78	16.46	2.72
8:22:00	2.0	12.00	25.28	309.34	16.47	2.73
8:24:00	2.0	14.00	25.28	359.90	16.47	2.73
8:26:00	2.0	16.00	25.40	410.70	16.49	2.75
8:28:00	2.0	18.00	25.28	461.26	16.50	2.76
8:30:00	2.0	20.00	25.40	512.06	16.50	2.76
8:32:00	2.0	22.00	25.28	562.62	16.50	2.76
8:34:00	2.0	24.00	24.68	611.98	16.47	2.73
8:36:00	2.0	26.00	25.28	662.54	16.52	2.78
8:38:00	2.0	28.00	25.52	713.58	16.52	2.78
8:40:00	2.0	30.00	25.52	764.62	16.53	2.79
8:45:00	5.0	35.00	25.52	892.22	16.55	2.81
8:50:00	5.0	40.00	25.64	1020.42	16.81	3.07
8:55:00	5.0	45.00	25.52	1148.02	16.81	3.07
9:00:00	5.0	50.00	25.52	1275.62	16.56	2.82

Specific Capacity Test

Location/Well ID	RB-4 (Lower)
Date	1/8/2020
Screened Interval	83 to 138 ft bgs
Pump Depth (ft btoc)	137.00
Packer Depth (ft btoc)	71.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 28 to 58 ft btoc	13.78
Initial Water Level Within 83 to 138 ft btoc	13.74
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	30148.50
Approx Pumped Volume (gal)	30148.50
Calculated Volume Purged (gal)	30127.36
Difference in Volume Pumped vs. Calculated	21.14
Number of Specific Capacity Steps	4
Pumping Rates (in order)	25, 50, 75, 100 gpm

9:05:00	5.0	55.00	25.76	1404.42	16.57	2.83
9:10:00	5.0	60.00	25.52	1532.02	16.56	2.82
9:20:00	10.0	70.00	24.90	1781.02	16.56	2.82
9:30:00	10.0	80.00	25.88	2039.82	16.57	2.83
9:40:00	10.0	90.00	25.28	2292.62	16.57	2.83
9:50:00	10.0	100.00	25.04	2543.02	16.55	2.81
10:00:00	10.0	110.00	24.92	2792.22	16.55	2.81
10:10:00	10.0	120.00	24.68	3039.02	16.56	2.82

Total Volume Pumped for Step 1 (gal)	**3039.02**
Average Pumping Rate (gpm)	**25.75**
Specific Capacity (gpm/ft)	**9.13**

Step 2 - Time (HR:MN:SEC)	Change in Time Between measurements (min)	Elapsed Time from Test Start (min)	Pumping Rate (gpm)	Total Volume Pumped (gal)	Depth to Water (ft)	Drawdown (ft)	Elapsed Time from Step 2 Start (min)
10:10:20	0.3	120.33	42.86	3053.30	18.13	4.39	0.33
10:10:40	0.3	120.67	47.36	3069.09	18.78	5.04	0.67
10:11:00	0.3	121.00	50.79	3086.02	18.95	5.21	1.00
10:12:00	1.0	122.00	50.16	3136.18	19.05	5.31	2.00
10:13:00	1.0	123.00	50.16	3186.34	19.12	5.38	3.00
10:14:00	1.0	124.00	50.16	3236.50	19.20	5.46	4.00
10:15:00	1.0	125.00	50.16	3286.66	19.20	5.46	5.00
10:16:00	1.0	126.00	50.29	3336.95	19.22	5.48	6.00
10:17:00	1.0	127.00	49.20	3386.15	19.14	5.40	7.00
10:18:00	1.0	128.00	50.29	3436.44	19.25	5.51	8.00
10:19:00	1.0	129.00	50.29	3486.73	19.25	5.51	9.00
10:20:00	1.0	130.00	49.92	3536.65	19.35	5.61	10.00
10:22:00	2.0	132.00	51.03	3638.71	19.10	5.36	12.00
10:24:00	2.0	134.00	50.91	3740.53	19.38	5.64	14.00
10:26:00	2.0	136.00	51.03	3842.59	19.38	5.64	16.00
10:28:00	2.0	138.00	51.03	3944.65	19.40	5.66	18.00

Specific Capacity Test

Location/Well ID	RB-4 (Lower)
Date	1/8/2020
Screened Interval	83 to 138 ft bgs
Pump Depth (ft btoc)	137.00
Packer Depth (ft btoc)	71.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 28 to 58 ft btoc	13.78
Initial Water Level Within 83 to 138 ft btoc	13.74
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	30148.50
Approx Pumped Volume (gal)	30148.50
Calculated Volume Purged (gal)	30127.36
Difference in Volume Pumped vs. Calculated	21.14
Number of Specific Capacity Steps	4
Pumping Rates (in order)	25, 50, 75, 100 gpm

10:30:00	2.0	140.00	51.15	4046.95	19.43	5.69	20.00
10:32:00	2.0	142.00	51.03	4149.01	19.43	5.69	22.00
10:34:00	2.0	144.00	51.03	4251.07	19.43	5.69	24.00
10:36:00	2.0	146.00	51.03	4353.13	19.43	5.69	26.00
10:38:00	2.0	148.00	51.03	4455.19	19.45	5.71	28.00
10:40:00	2.0	150.00	50.91	4557.01	19.43	5.69	30.00
10:45:00	5.0	155.00	50.91	4811.56	19.43	5.69	35.00
10:50:00	5.0	160.00	50.91	5066.11	19.43	5.69	40.00
10:55:00	5.0	165.00	50.16	5316.91	19.37	5.63	45.00
11:00:00	5.0	170.00	50.16	5567.71	19.37	5.63	50.00
11:05:00	5.0	175.00	50.04	5817.91	19.37	5.63	55.00
11:10:00	5.0	180.00	50.29	6069.36	19.38	5.64	60.00
11:20:00	10.0	190.00	50.16	6570.96	19.36	5.62	70.00
11:30:00	10.0	200.00	49.68	7067.76	19.36	5.62	80.00
11:40:00	10.0	210.00	50.66	7574.36	19.42	5.68	90.00
11:50:00	10.0	220.00	50.16	8075.96	19.36	5.62	100.00
12:00:00	10.0	230.00	50.16	8577.56	19.37	5.63	110.00
12:10:00	10.0	240.00	49.80	9075.56	19.47	5.73	120.00

Total Volume Pumped for Step 2 (gal)	**6036.54**
Average Pumping Rate (gpm)	**50.14**
Specific Capacity (gpm/ft)	**8.75**

Step 3 - Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time from Test Start (min)	Pumping Rate (gpm)	Total Volume Pumped (Gallons)	Depth to Water (ft)	Drawdown (ft)	Elapsed Time from Step 3 Start (min)
12:10:20	0.3	240.33	60.27	9095.65	20.35	6.61	0.33
12:10:40	0.3	240.67	72.32	9119.76	21.33	7.59	0.67
12:11:00	0.3	241.00	75.01	9144.76	21.72	7.98	1.00
12:12:00	1.0	242.00	75.26	9220.02	21.93	8.19	2.00
12:13:00	1.0	243.00	75.38	9295.40	22.00	8.26	3.00
12:14:00	1.0	244.00	75.26	9370.66	22.05	8.31	4.00

Specific Capacity Test

Location/Well ID	RB-4 (Lower)
Date	1/8/2020
Screened Interval	83 to 138 ft bgs
Pump Depth (ft btoc)	137.00
Packer Depth (ft btoc)	71.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 28 to 58 ft btoc	13.78
Initial Water Level Within 83 to 138 ft btoc	13.74
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	30148.50
Approx Pumped Volume (gal)	30148.50
Calculated Volume Purged (gal)	30127.36
Difference in Volume Pumped vs. Calculated	21.14
Number of Specific Capacity Steps	4
Pumping Rates (in order)	25, 50, 75, 100 gpm

12:15:00	1.0	245.00	74.88	9445.54	22.08	8.34	5.00
12:16:00	1.0	246.00	74.76	9520.30	22.10	8.36	6.00
12:17:00	1.0	247.00	74.76	9595.06	22.11	8.37	7.00
12:18:00	1.0	248.00	75.26	9670.32	22.17	8.43	8.00
12:19:00	1.0	249.00	74.27	9744.59	22.13	8.39	9.00
12:20:00	1.0	250.00	74.88	9819.47	22.16	8.42	10.00
12:22:00	2.0	252.00	75.38	9970.23	22.15	8.41	12.00
12:24:00	2.0	254.00	75.26	10120.75	22.16	8.42	14.00
12:26:00	2.0	256.00	75.38	10271.51	22.16	8.42	16.00
12:28:00	2.0	258.00	75.26	10422.03	22.16	8.42	18.00
12:30:00	2.0	260.00	74.14	10570.31	22.22	8.48	20.00
12:32:00	2.0	262.00	75.26	10720.83	22.26	8.52	22.00
12:34:00	2.0	264.00	75.14	10871.11	22.25	8.51	24.00
12:36:00	2.0	266.00	75.26	11021.63	22.25	8.51	26.00
12:38:00	2.0	268.00	75.14	11171.91	22.27	8.53	28.00
12:40:00	2.0	270.00	75.26	11322.43	22.27	8.53	30.00
12:45:00	5.0	275.00	75.01	11697.48	22.27	8.53	35.00
12:50:00	5.0	280.00	75.01	12072.53	22.31	8.57	40.00
12:55:00	5.0	285.00	74.88	12446.93	22.31	8.57	45.00
13:00:00	5.0	290.00	75.11	12822.48	22.34	8.60	50.00
13:05:00	5.0	295.00	75.26	13198.78	22.34	8.60	55.00
13:10:00	5.0	300.00	75.13	13574.43	22.35	8.61	60.00
13:20:00	10.0	310.00	74.64	14320.83	22.33	8.59	70.00
13:30:00	10.0	320.00	75.01	15070.93	22.38	8.64	80.00
13:40:00	10.0	330.00	75.50	15825.93	22.46	8.72	90.00
13:50:00	10.0	340.00	75.50	16580.93	22.48	8.74	100.00
14:00:00	10.0	350.00	75.26	17333.53	22.48	8.74	110.00
14:10:00	10.0	360.00	75.14	18084.93	22.48	8.74	120.00

Total Volume Pumped for Step 3 (gal)	**9009.37**
Average Pumping Rate (gpm)	**74.57**
Specific Capacity (gpm/ft)	**8.53**

Specific Capacity Test

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	RB-4 (Lower)
Date	1/8/2020
Screened Interval	83 to 138 ft bgs
Pump Depth (ft btoc)	137.00
Packer Depth (ft btoc)	71.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 28 to 58 ft btoc	13.78
Initial Water Level Within 83 to 138 ft btoc	13.74
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	30148.50
Approx Pumped Volume (gal)	30148.50
Calculated Volume Purged (gal)	30127.36
Difference in Volume Pumped vs. Calculated	21.14
Number of Specific Capacity Steps	4
Pumping Rates (in order)	25, 50, 75, 100 gpm

Step 4 - Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time from Test Start (min)	Pumping Rate (gpm)	Total Volume Pumped (Gallons)	Depth to Water (ft)	Drawdown (ft)	Elapsed Time from Step 4 Start (min)
14:10:20	0.3	360.33	94.92	18116.57	24.35	10.61	0.33
14:10:40	0.3	360.67	103.99	18151.23	25.23	11.49	0.33
14:11:00	0.3	361.00	101.91	18185.20	25.25	11.51	0.67
14:12:00	1.0	362.00	100.80	18286.00	25.27	11.53	1.67
14:13:00	1.0	363.00	100.80	18386.80	25.33	11.59	2.67
14:14:00	1.0	364.00	100.68	18487.48	25.40	11.66	3.67
14:15:00	1.0	365.00	100.56	18588.04	25.41	11.67	4.67
14:16:00	1.0	366.00	100.56	18688.60	25.43	11.69	5.67
14:17:00	1.0	367.00	100.56	18789.16	25.45	11.71	6.67
14:18:00	1.0	368.00	100.56	18889.72	25.47	11.73	7.67
14:19:00	1.0	369.00	100.56	18990.28	25.47	11.73	8.67
14:20:00	1.0	370.00	100.56	19090.84	25.50	11.76	9.67
14:22:00	2.0	372.00	100.56	19291.96	25.50	11.76	11.67
14:24:00	2.0	374.00	100.68	19493.32	25.52	11.78	13.67
14:26:00	2.0	376.00	100.56	19694.44	25.55	11.81	15.67
14:28:00	2.0	378.00	100.32	19895.08	25.55	11.81	17.67
14:30:00	2.0	380.00	100.44	20095.96	25.55	11.81	19.67
14:32:00	2.0	382.00	100.44	20296.84	25.55	11.81	21.67
14:34:00	2.0	384.00	100.44	20497.72	25.55	11.81	23.67
14:36:00	2.0	386.00	100.44	20698.60	25.55	11.81	25.67
14:38:00	2.0	388.00	100.44	20899.48	25.55	11.81	27.67
14:40:00	2.0	390.00	100.44	21100.36	25.55	11.81	29.67
14:45:00	5.0	395.00	100.44	21602.56	25.57	11.83	34.67
14:50:00	5.0	400.00	100.44	22104.76	25.55	11.81	39.67
14:55:00	5.0	405.00	100.32	22606.36	25.58	11.84	44.67
15:00:00	5.0	410.00	100.32	23107.96	25.58	11.84	49.67
15:05:00	5.0	415.00	100.20	23608.96	25.58	11.84	54.67
15:10:00	5.0	420.00	100.32	24110.56	25.58	11.84	59.67

Specific Capacity Test

Location/Well ID	RB-4 (Lower)
Date	1/8/2020
Screened Interval	83 to 138 ft bgs
Pump Depth (ft btoc)	137.00
Packer Depth (ft btoc)	71.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 28 to 58 ft btoc	13.78
Initial Water Level Within 83 to 138 ft btoc	13.74
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	30148.50
Approx Pumped Volume (gal)	30148.50
Calculated Volume Purged (gal)	30127.36
Difference in Volume Pumped vs. Calculated	21.14
Number of Specific Capacity Steps	4
Pumping Rates (in order)	25, 50, 75, 100 gpm

15:20:00	10.0	430.00	100.32	25113.76	25.60	11.86	69.67
15:30:00	10.0	440.00	100.44	26118.16	25.60	11.86	79.67
15:40:00	10.0	450.00	100.32	27121.36	25.60	11.86	89.67
15:50:00	10.0	460.00	100.20	28123.36	25.62	11.88	99.67
16:00:00	10.0	470.00	100.20	29125.36	25.63	11.89	109.67
16:10:00	10.0	480.00	100.20	30127.36	25.63	11.89	119.67
16:10:30	0.5	480.50	0.00	30127.36	16.30	2.56	120.17

Total Volume Pumped for Step 4 (gal)	**12042.43**
Average Pumping Rate (gpm)	**100.44**
Specific Capacity (gpm/ft)	**8.45**

Acronyms & Abbreviations

bgs = below ground surface
btoc = below top of casing
ft = feet
gal = gallons
gpm = gallons per minute
min = minutes

RB-4 Lower Screen (83 to 138 ft) Linear Drawdown Plot
Step 1:
Total Volume Pumped: 3039.02 gal
Avg. Flow Rate: 25.75 gpm
Drawdown: 2.82 ft
Specific Capacity: 9.13 gpm/ft
Step 2:
Total Volume Pumped: 6036.54 gal
Avg. Flow Rate: 50.14 gpm
Drawdown: 5.73 ft
Specific Capacity: 8.75 gpm/ft
Step 3:
Total Volume Pumped: 9009.37 gal
Avg. Flow Rate: 74.57 gpm
Drawdown: 8.74 ft
Specific Capacity: 8.53 gpm/ft
Step 4:
Total Volume Pumped: 12042.43 gal
Avg. Flow Rate: 100.44 gpm
Drawdown: 11.89 ft
Specific Capacity: 8.45 gpm/ft
Flow rate adjustment
Flow rate adjustment
Flow rate adjustment
Inconsistent Pumping Rate
Recovery
Legend
Transducer
Manual
Drawdown (feet)
Elapsed Time (min)
0
2
4
6
8
10
12
14
0
100
200
300
400
500
600
700

RB-4 Lower Screen (83 to 138 ft) Semi-Log Drawdown Plot

Specific Capacity/
Injection Test Monitoring Point

Location/Well ID	**MW-28-025**
Well Being Tested	**RB-4**
Screened Interval of Well Being Tested	**83 to 138 ft bgs**
Approximate Distance from Testing Well	**100 ft**

Date	Time	Date and Time	Depth to Water
1/7/2020	12:53	1/7/20 12:53	14.81
1/8/2020	7:43	1/8/20 7:43	14.60
1/8/2020	8:46	1/8/20 8:46	14.65
1/8/2020	9:57	1/8/20 9:57	14.68
1/8/2020	10:43	1/8/20 10:43	14.73
1/8/2020	11:58	1/8/20 11:58	14.78
1/8/2020	12:42	1/8/20 12:42	14.83
1/8/2020	13:55	1/8/20 13:55	14.87
1/8/2020	14:41	1/8/20 14:41	14.92
1/8/2020	15:58	1/8/20 15:58	14.93
1/8/2020	16:22	1/8/20 16:22	14.92
1/9/2020	7:14	1/9/20 7:14	14.58
1/9/2020	8:43	1/9/20 8:43	14.58
1/9/2020	9:54	1/9/20 9:54	14.63
1/9/2020	10:41	1/9/20 10:41	14.66
1/9/2020	11:57	1/9/20 11:57	14.71
1/9/2020	12:42	1/9/20 12:42	14.76
1/9/2020	13:54	1/9/20 13:54	14.81
1/9/2020	14:42	1/9/20 14:42	14.85
1/9/2020	15:54	1/9/20 15:54	14.90
1/9/2020	16:25	1/9/20 16:25	14.85
1/10/2020	8:28	1/10/20 8:28	14.39

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

Location/Well ID	**MW-28-090**
Well Being Tested	**RB-4**
Screened Interval of Well Being Tested	**83 to 138 ft bgs**
Approximate Distance from Testing Well	**98 ft**

Date	Time	Date and Time	Depth to Water
1/7/2020	12:47	1/7/20 12:47	15.61
1/8/2020	7:42	1/8/20 7:42	15.37
1/8/2020	8:48	1/8/20 8:48	15.60
1/8/2020	9:56	1/8/20 9:56	15.65
1/8/2020	10:42	1/8/20 10:42	15.88
1/8/2020	11:57	1/8/20 11:57	15.93
1/8/2020	12:41	1/8/20 12:41	16.14
1/8/2020	13:54	1/8/20 13:54	16.21
1/8/2020	14:42	1/8/20 14:42	16.43
1/8/2020	15:57	1/8/20 15:57	16.48
1/8/2020	16:23	1/8/20 16:23	15.80
1/9/2020	7:13	1/9/20 7:13	15.34
1/9/2020	8:42	1/9/20 8:42	15.22
1/9/2020	9:53	1/9/20 9:53	15.40
1/9/2020	10:39	1/9/20 10:39	15.44
1/9/2020	11:56	1/9/20 11:56	15.51
1/9/2020	12:41	1/9/20 12:41	15.55
1/9/2020	13:53	1/9/20 13:53	15.60
1/9/2020	14:41	1/9/20 14:41	15.67
1/9/2020	15:54	1/9/20 15:54	15.75
1/9/2020	16:22	1/9/20 16:22	15.68
1/10/2020	8:20	1/10/20 8:20	15.18

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

MW-28-025 During RB-4 Lower Screen (83 to 138 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Distance to RB-4: ~100 Feet
Legend
Transducer
Manual
13.5
14
14.5
15
15.5
16
Depth to Water (feet)
1/8/20 6:00
1/8/20 9:00
1/8/20 12:00
1/8/20 15:00
1/8/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 3039.0 gal
Avg. Flow Rate: 25.75 gpm
Drawdown in RB-4: 2.82 ft
Specific Capacity: 9.13 gpm/ft
Step 2:
Total Volume Pumped: 6036.5 gal
Avg. Flow Rate: 50.14 gpm
Drawdown in RB-4: 5.73 ft
Specific Capacity: 8.75 gpm/ft
Step 3:
Total Volume Pumped: 9009.4 gal
Avg. Flow Rate: 74.57 gpm
Drawdown in RB-4: 8.74 ft
Specific Capacity: 8.53 gpm/ft
Step 4:
Total Volume Pumped: 12042.4 gal
Avg. Flow Rate: 100.44 gpm
Drawdown in RB-4: 11.89 ft
Specific Capacity: 8.45 gpm/ft

MW-28-090 During RB-4 Lower Screen (83 to 138 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Distance to RB-4: ~98 Feet
Legend
Transducer
Manual
Depth to Water (feet)
14.5
15
15.5
16
16.5
17
17.5
1/8/20 6:00
1/8/20 9:00
1/8/20 12:00
1/8/20 15:00
1/8/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 3039.0 gal
Avg. Flow Rate: 25.75 gpm
Drawdown in RB-4: 2.82 ft
Specific Capacity: 9.13 gpm/ft
Step 2:
Total Volume Pumped: 6036.5 gal
Avg. Flow Rate: 50.14 gpm
Drawdown in RB-4: 5.73 ft
Specific Capacity: 8.75 gpm/ft
Step 3:
Total Volume Pumped: 9009.4 gal
Avg. Flow Rate: 74.57 gpm
Drawdown in RB-4: 8.74 ft
Specific Capacity: 8.53 gpm/ft
Step 4:
Total Volume Pumped: 12042.4 gal
Avg. Flow Rate: 100.44 gpm
Drawdown in RB-4: 11.89 ft
Specific Capacity: 8.45 gpm/ft

MW-46-175 During RB-4 Lower Screen (83 to 138 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Manual water levels not collected during test.
Legend
Transducer
Level (feet)
39
38.5
38
37.5
37
36.5
36
35.5
35
34.5
34
1/8/20 6:00
1/8/20 9:00
1/8/20 12:00
1/8/20 15:00
1/8/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 3039.0 gal
Avg. Flow Rate: 25.75 gpm
Drawdown in RB-4: 2.82 ft
Specific Capacity: 9.13 gpm/ft
Step 2:
Total Volume Pumped: 6036.5 gal
Avg. Flow Rate: 50.14 gpm
Drawdown in RB-4: 5.73 ft
Specific Capacity: 8.75 gpm/ft
Step 3:
Total Volume Pumped: 9009.4 gal
Avg. Flow Rate: 74.57 gpm
Drawdown in RB-4: 8.74 ft
Specific Capacity: 8.53 gpm/ft
Step 4:
Total Volume Pumped: 12042.4 gal
Avg. Flow Rate: 100.44 gpm
Drawdown in RB-4: 11.89 ft
Specific Capacity: 8.45 gpm/ft

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	**RB-5**
Date -	**12/17/2019**
Screened Interval Tested -	**Lower Screen (64-89 ft)**
Packer Set Depth -	**51-54 ft btoc**
Packer Seal Test -	Confirmed packer to be watertight before test
Tests Conducted -	4 step Specific Capacity Test (25, 50, 75, and 100 GPM Respectfully)
Purpose -	Well Performance Test
Summary -	Specific Capacity: 10.44-11.30 GPM/FT
Notes -	**Inconsistant pumping rate at start of Step 1.** **Pump was unstable throughout test. Flow rate was adjusted when needed.**
Oversight Signature -	
Date -	1/2/2020

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	**RB-5**
Date -	**12/17/2019**
Screened Interval -	**64' - 89' bgs**
Pump Depth (ft btoc) -	**87**
Packer Depth (ft btoc) -	**51**
Packer Leak Test (Pass/Fail) -	**Pass**
Initial Water Level Within Screen Interval 24' - 44' -	**12.56**
Initial Water Level Within Screen Interval 64' - 89' -	**12.57**
Initial Totalizer Reading (gal) -	**0**
Final Totalizer Reading (gal) -	**30543**
Approx. Pumped Volume (gal) -	**30543**
Calculated Volume Purged (gal) -	**30453.06**
Differnce in volume Pumped vs. Calculated -	**89.94**
Number of Specific Capacity Steps -	**4**
Pumping Rates (List In Order) -	**25, 50, 75, and 100 GPM Respectfully**

Step 1						
Time (HR:MN:SEC)	Change in Time between Measurements (Min)	Elapsed Time (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)
8:30:00	0	0	70.62	0.00	13.70	1.14
8:30:20	0.3	0.33	20.22	6.74	13.98	1.42
8:30:40	0.3	0.67	30.90	17.04	14.52	1.96
8:31:00	0.3	1.00	25.28	25.47	14.62	2.06
8:32:00	1.0	2.00	24.32	49.79	14.70	2.14
8:33:00	1.0	3.00	23.46	73.25	14.63	2.07
8:34:00	1.0	4.00	22.62	95.87	14.58	2.02
8:35:00	1.0	5.00	22.26	118.13	14.53	1.97
8:36:00	1.0	6.00	22.00	140.13	14.53	1.97
8:37:00	1.0	7.00	25.28	165.41	14.68	2.12
8:38:00	1.0	8.00	22.91	188.32	14.62	2.06
8:39:00	1.0	9.00	22.86	211.18	14.60	2.04
8:40:00	1.0	10.00	23.59	234.77	14.66	2.10
8:42:00	2.0	12.00	24.68	284.13	14.74	2.18
8:44:00	2.0	14.00	24.92	333.97	14.77	2.21
8:46:00	2.0	16.00	25.52	385.01	14.83	2.27
8:48:00	2.0	18.00	23.96	432.93	14.69	2.13
8:50:00	2.0	20.00	26.25	485.43	14.92	2.36
8:52:00	2.0	22.00	25.88	537.19	14.90	2.34
8:54:00	2.0	24.00	25.28	587.75	14.93	2.37
8:56:00	2.0	26.00	24.56	636.87	14.80	2.24
8:58:00	2.0	28.00	25.40	687.67	14.85	2.29
9:00:00	2.0	30.00	25.04	737.75	14.82	2.26
9:05:00	5.0	35.00	24.35	859.50	14.78	2.22
9:10:00	5.0	40.00	22.62	972.60	14.62	2.06
9:15:00	5.0	45.00	26.00	1102.60	14.90	2.34
9:20:00	5.0	50.00	25.40	1229.60	14.86	2.30
9:25:00	5.0	55.00	26.98	1364.50	15.00	2.44
9:30:00	5.0	60.00	26.50	1497.00	14.95	2.39
9:40:00	10.0	70.00	26.00	1757.00	14.94	2.38
9:50:00	10.0	80.00	25.04	2007.40	14.84	2.28
10:00:00	10.0	90.00	24.44	2251.80	14.80	2.24
10:10:00	10.0	100.00	24.32	2495.00	14.78	2.22
10:20:00	10.0	110.00	23.84	2733.40	14.75	2.19
10:30:00	10.0	120.00	23.10	2964.40	14.67	2.11
10:40:00	10.0	130.00	24.92	3213.60	14.85	2.29

Total Volume Pumped for Step 1 (GAL):	3213.60
Average Pumping Rate (GPM):	25.87
Specific Capacity (GPM/FT):	11.30

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	RB-5
Date -	12/17/2019
Screened Interval -	64' - 89' bgs
Pump Depth (ft btoc) -	87
Packer Depth (ft btoc) -	51
Packer Leak Test (Pass/Fail) -	Pass
Initial Water Level Within Screen Interval 24' - 44' -	12.56
Initial Water Level Within Screen Interval 64' - 89' -	12.57
Initial Totalizer Reading (gal) -	0
Final Totalizer Reading (gal) -	30543
Approx. Pumped Volume (gal) -	30543
Calculated Volume Purged (gal) -	30453.06
Differnce in volume Pumped vs. Calculated -	89.94
Number of Specific Capacity Steps -	4
Pumping Rates (List In Order) -	25, 50, 75, and 100 GPM Respectfully

Step 2

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 2 Start (Min)
10:40:20	0.3	130.33	42.00	3227.60	16.66	4.10	0.33
10:40:40	0.3	130.67	48.84	3243.88	17.05	4.49	0.67
10:41:00	0.3	131.00	51.52	3261.05	17.07	4.51	1.00
10:42:00	1.0	132.00	49.80	3310.85	16.95	4.39	2.00
10:43:00	1.0	133.00	49.80	3360.65	16.96	4.40	3.00
10:44:00	1.0	134.00	49.32	3409.97	16.96	4.40	4.00
10:45:00	1.0	135.00	49.32	3459.29	16.96	4.40	5.00
10:46:00	1.0	136.00	49.32	3508.61	16.96	4.40	6.00
10:47:00	1.0	137.00	51.28	3559.89	17.12	4.56	7.00
10:48:00	1.0	138.00	51.28	3611.17	17.12	4.56	8.00
10:49:00	1.0	139.00	51.03	3662.20	17.10	4.54	9.00
10:50:00	1.0	140.00	51.03	3713.23	17.10	4.54	10.00
10:52:00	2.0	142.00	51.03	3815.29	17.10	4.54	12.00
10:54:00	2.0	144.00	50.79	3916.87	17.09	4.53	14.00
10:56:00	2.0	146.00	50.54	4017.95	17.06	4.50	16.00
10:58:00	2.0	148.00	50.54	4119.03	17.05	4.49	18.00
11:00:00	2.0	150.00	49.56	4218.15	16.93	4.37	20.00
11:02:00	2.0	152.00	49.20	4316.55	16.90	4.34	22.00
11:04:00	2.0	154.00	53.22	4422.99	17.23	4.67	24.00
11:06:00	2.0	156.00	52.72	4528.43	17.21	4.65	26.00
11:08:00	2.0	158.00	52.72	4633.87	17.22	4.66	28.00
11:10:00	2.0	160.00	52.85	4739.57	17.22	4.66	30.00
11:15:00	5.0	165.00	52.00	4999.57	17.21	4.65	35.00
11:20:00	5.0	170.00	51.76	5258.37	17.21	4.65	40.00
11:25:00	5.0	175.00	51.15	5514.12	17.20	4.64	45.00
11:30:00	5.0	180.00	50.29	5765.57	17.10	4.54	50.00
11:35:00	5.0	185.00	49.92	6015.17	17.09	4.53	55.00
11:40:00	5.0	190.00	51.40	6272.17	17.22	4.66	60.00
11:50:00	10.0	200.00	50.79	6780.07	17.16	4.60	70.00
12:00:00	10.0	210.00	51.15	7291.57	17.20	4.64	80.00
12:10:00	10.0	220.00	49.68	7788.37	17.10	4.54	90.00
12:20:00	10.0	230.00	44.69	8235.27	16.84	4.28	100.00
12:30:00	10.0	240.00	53.94	8774.67	17.48	4.92	110.00
12:40:00	10.0	250.00	53.34	9308.07	17.40	4.84	120.00

Total Volume Pumped for Step 2 (GAL):	6094.47
Average Pumping Rate (GPM):	50.52
Specific Capacity (GPM/FT):	10.44

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	RB-5
Date -	12/17/2019
Screened Interval -	64' - 89' bgs
Pump Depth (ft btoc) -	87
Packer Depth (ft btoc) -	51
Packer Leak Test (Pass/Fail) -	Pass
Initial Water Level Within Screen Interval 24' - 44' -	12.56
Initial Water Level Within Screen Interval 64' - 89' -	12.57
Initial Totalizer Reading (gal) -	0
Final Totalizer Reading (gal) -	30543
Approx. Pumped Volume (gal) -	30543
Calculated Volume Purged (gal) -	30453.06
Differnce in volume Pumped vs. Calculated -	89.94
Number of Specific Capacity Steps -	4
Pumping Rates (List In Order) -	25, 50, 75, and 100 GPM Respectfully

Step 3

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 3 Start (Min)
12:40:20	0.3	250.33	70.01	9331.41	18.40	5.84	0.33
12:40:40	0.3	250.67	76.96	9357.06	19.41	6.85	0.67
12:41:00	0.3	251.00	75.14	9382.11	19.32	6.76	1.00
12:42:00	1.0	252.00	75.01	9457.12	19.28	6.72	2.00
12:43:00	1.0	253.00	74.88	9532.00	19.28	6.72	3.00
12:44:00	1.0	254.00	75.01	9607.01	19.28	6.72	4.00
12:45:00	1.0	255.00	74.88	9681.89	19.29	6.73	5.00
12:46:00	1.0	256.00	75.01	9756.90	19.31	6.75	6.00
12:47:00	1.0	257.00	75.14	9832.04	19.34	6.78	7.00
12:48:00	1.0	258.00	75.01	9907.05	19.35	6.79	8.00
12:49:00	1.0	259.00	75.14	9982.19	19.34	6.78	9.00
12:50:00	1.0	260.00	74.88	10057.07	19.34	6.78	10.00
12:52:00	2.0	262.00	74.88	10206.83	19.34	6.78	12.00
12:54:00	2.0	264.00	74.64	10356.11	19.32	6.76	14.00
12:56:00	2.0	266.00	74.52	10505.15	19.32	6.76	16.00
12:58:00	2.0	268.00	74.39	10653.93	19.32	6.76	18.00
13:00:00	2.0	270.00	74.15	10802.23	19.32	6.76	20.00
13:02:00	2.0	272.00	74.27	10950.77	19.32	6.76	22.00
13:04:00	2.0	274.00	74.15	11099.07	19.32	6.76	24.00
13:06:00	2.0	276.00	75.25	11249.57	19.40	6.84	26.00
13:08:00	2.0	278.00	75.26	11400.09	19.38	6.82	28.00
13:10:00	2.0	280.00	75.26	11550.61	19.38	6.82	30.00
13:15:00	5.0	285.00	74.88	11925.01	19.30	6.74	35.00
13:20:00	5.0	290.00	75.26	12301.31	19.32	6.76	40.00
13:25:00	5.0	295.00	74.52	12673.91	19.28	6.72	45.00
13:30:00	5.0	300.00	74.39	13045.86	19.28	6.72	50.00
13:35:00	5.0	305.00	74.39	13417.81	19.28	6.72	55.00
13:40:00	5.0	310.00	74.52	13790.41	19.27	6.71	60.00
13:50:00	10.0	320.00	73.66	14527.01	19.19	6.63	70.00
14:00:00	10.0	330.00	75.26	15279.61	19.34	6.78	80.00
14:10:00	10.0	340.00	75.74	16037.01	19.31	6.75	90.00
14:20:00	10.0	350.00	75.14	16788.41	19.38	6.82	100.00
14:30:00	10.0	360.00	75.14	17539.81	19.38	6.82	110.00
14:40:00	10.0	370.00	75.01	18289.91	19.40	6.84	120.00

Total Volume Pumped for Step 3 (GAL):	8981.84
Average Pumping Rate (GPM):	74.76
Specific Capacity (GPM/FT):	10.93

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	RB-5
Date -	12/17/2019
Screened Interval -	64' - 89' bgs
Pump Depth (ft btoc) -	87
Packer Depth (ft btoc) -	51
Packer Leak Test (Pass/Fail) -	Pass
Initial Water Level Within Screen Interval 24' - 44' -	12.56
Initial Water Level Within Screen Interval 64' - 89' -	12.57
Initial Totalizer Reading (gal) -	0
Final Totalizer Reading (gal) -	30543
Approx. Pumped Volume (gal) -	30543
Calculated Volume Purged (gal) -	30453.06
Differnce in volume Pumped vs. Calculated -	89.94
Number of Specific Capacity Steps -	4
Pumping Rates (List In Order) -	25, 50, 75, and 100 GPM Respectfully

Step 4

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 4 Start (Min)
14:40:20	0.3	370.33	100.49	18323.40	21.39	8.83	0.33
14:40:40	0.3	370.67	101.41	18357.21	21.61	9.05	0.33
14:41:00	0.3	371.00	101.41	18391.01	21.64	9.08	0.67
14:42:00	1.0	372.00	101.41	18492.42	21.66	9.10	1.67
14:43:00	1.0	373.00	101.41	18593.83	21.70	9.14	2.67
14:44:00	1.0	374.00	101.41	18695.24	21.71	9.15	3.67
14:45:00	1.0	375.00	101.28	18796.52	21.72	9.16	4.67
14:46:00	1.0	376.00	101.28	18897.80	21.74	9.18	5.67
14:47:00	1.0	377.00	101.41	18999.21	21.73	9.17	6.67
14:48:00	1.0	378.00	101.41	19100.62	21.74	9.18	7.67
14:49:00	1.0	379.00	101.41	19202.03	21.75	9.19	8.67
14:50:00	1.0	380.00	101.41	19303.44	21.74	9.18	9.67
14:52:00	2.0	382.00	101.41	19506.26	21.74	9.18	11.67
14:54:00	2.0	384.00	101.41	19709.08	21.74	9.18	13.67
14:56:00	2.0	386.00	101.41	19911.90	21.75	9.19	15.67
14:58:00	2.0	388.00	102.02	20115.94	21.76	9.20	17.67
15:00:00	2.0	390.00	101.41	20318.76	21.76	9.20	19.67
15:02:00	2.0	392.00	101.41	20521.58	21.77	9.21	21.67
15:04:00	2.0	394.00	101.41	20724.40	21.77	9.21	23.67
15:06:00	2.0	396.00	101.41	20927.22	21.77	9.21	25.67
15:08:00	2.0	398.00	101.41	21130.04	21.77	9.21	27.67
15:10:00	2.0	400.00	101.41	21332.86	21.77	9.21	29.67
15:15:00	5.0	405.00	101.41	21839.91	21.77	9.21	34.67
15:20:00	5.0	410.00	101.16	22345.71	21.78	9.22	39.67
15:25:00	5.0	415.00	101.41	22852.76	21.78	9.22	44.67
15:30:00	5.0	420.00	101.41	23359.81	21.80	9.24	49.67
15:35:00	5.0	425.00	101.54	23867.51	21.80	9.24	54.67
15:40:00	5.0	430.00	101.41	24374.56	21.80	9.24	59.67
15:50:00	10.0	440.00	101.41	25388.66	21.80	9.24	69.67
16:00:00	10.0	450.00	101.41	26402.76	21.80	9.24	79.67
16:10:00	10.0	460.00	101.04	27413.16	21.80	9.24	89.67
16:20:00	10.0	470.00	100.92	28422.36	21.80	9.24	99.67
16:30:00	10.0	480.00	101.91	29441.46	21.80	9.24	109.67
16:40:00	10.0	490.00	101.16	30453.06	21.80	9.24	119.67

Total Volume Pumped for Step 4 (GAL):	12163.15
Average Pumping Rate (GPM):	101.37
Specific Capacity (GPM/FT):	10.97

RB-5 Lower Screen (64-89 ft) Linear Drawdown Plot
Step 1:
Total Volume Pumped: 3213.60 gal
Avg. Flow Rate: 25.87 gpm
Drawdown: 2.29 ft
Specific Capacity: 11.30 gpm/ft
Pump was unstable throughout test. Flow rate was adjusted when needed.
Legend
Transducer
Manual
Step 2:
Total Volume Pumped: 6094.47 gal
Avg. Flow Rate: 50.52 gpm
Drawdown: 4.84 ft
Specific Capacity: 10.44 gpm/ft
Inconsistent Pumping Rate
Step 3:
Total Volume Pumped: 8981.84 gal
Avg. Flow Rate: 74.76 gpm
Drawdown: 6.84 ft
Specific Capacity: 10.93 gpm/ft
Step 4:
Total Volume Pumped: 12163.15 gal
Avg. Flow Rate: 101.37 gpm
Drawdown: 9.24 ft
Specific Capacity: 10.97 gpm/ft
Drawdown (feet)
0
1
2
3
4
5
6
7
8
9
10
0
100
200
300
400
500
600
Elapsed Time (min)

RB-5 Lower Screen (64-89 ft)
Semi-Log Drawdown Plot

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID- MW-34-55

Well being tested- RB-5

Distance from monitoring point to testing well - ~ 123'

Task- Specific Capacity

Date	Time	Date+Time	Depth to Water
12/16/19	12:45	12/16/19 12:45	8.36
12/17/19	7:32	12/17/19 7:32	8.41
12/17/19	9:11	12/17/19 9:11	8.53
12/17/19	11:17	12/17/19 11:17	8.66
12/17/19	12:27	12/17/19 12:27	8.70
12/17/19	13:26	12/17/19 13:26	8.75
12/17/19	14:27	12/17/19 14:27	8.80
12/17/19	15:20	12/17/19 15:20	8.95
12/17/19	16:25	12/17/19 16:25	8.96
12/18/19	7:30	12/18/19 7:30	8.51
12/18/19	9:07	12/18/19 9:07	8.53
12/18/19	10:16	12/18/19 10:16	8.54
12/18/19	11:13	12/18/19 11:13	8.58
12/18/19	12:17	12/18/19 12:17	8.57
12/18/19	13:08	12/18/19 13:08	8.60
12/18/19	14:18	12/18/19 14:18	8.62
12/18/19	15:08	12/18/19 15:08	8.66
12/18/19	16:07	12/18/19 16:07	8.65
12/18/19	16:39	12/18/19 16:39	8.55
12/19/19	8:47	12/19/19 8:47	8.58

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID-	**MW-34-80**
Well being tested-	**RB-5**
Distance from monitoring point to testing well -	**~ 116'**
Task-	**Specific Capacity**

Date	Time	Date+Time	Depth to Water
12/16/19	12:44	12/16/19 12:44	8.52
12/17/19	7:31	12/17/19 7:31	8.61
12/17/19	9:10	12/17/19 9:10	8.73
12/17/19	11:18	12/17/19 11:18	8.88
12/17/19	12:26	12/17/19 12:26	8.92
12/17/19	13:27	12/17/19 13:27	8.96
12/17/19	14:26	12/17/19 14:26	9.03
12/17/19	15:21	12/17/19 15:21	9.22
12/17/19	16:25	12/17/19 16:25	9.23
12/18/19	7:29	12/18/19 7:29	8.67
12/18/19	9:06	12/18/19 9:06	8.71
12/18/19	10:16	12/18/19 10:16	8.71
12/18/19	11:12	12/18/19 11:12	8.74
12/18/19	12:17	12/18/19 12:17	8.74
12/18/19	13:07	12/18/19 13:07	8.74
12/18/19	14:17	12/18/19 14:17	8.75
12/18/19	15:07	12/18/19 15:07	9.22
12/18/19	16:07	12/18/19 16:07	8.82
12/18/19	16:38	12/18/19 16:38	8.71
12/19/19	8:46	12/19/19 8:46	8.76

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID-	**MW-34-100**
Well being tested-	**RB-5**
Distance from monitoring point to testing well -	**~ 113'**
Task-	**Specific Capacity**

Date	Time	Date+Time	Depth to Water
12/16/19	12:39	12/16/19 12:39	8.69
12/17/19	7:30	12/17/19 7:30	8.77
12/17/19	9:08	12/17/19 9:08	8.92
12/17/19	11:19	12/17/19 11:19	9.06
12/17/19	12:26	12/17/19 12:26	9.11
12/17/19	13:28	12/17/19 13:28	9.12
12/17/19	14:25	12/17/19 14:25	9.21
12/17/19	15:22	12/17/19 15:22	9.41
12/17/19	16:24	12/17/19 16:24	9.43
12/18/19	7:28	12/18/19 7:28	8.84
12/18/19	9:05	12/18/19 9:05	8.87
12/18/19	10:17	12/18/19 10:17	8.87
12/18/19	11:11	12/18/19 11:11	8.89
12/18/19	12:18	12/18/19 12:18	8.90
12/18/19	13:06	12/18/19 13:06	8.92
12/18/19	14:16	12/18/19 14:16	8.94
12/18/19	15:06	12/18/19 15:06	8.97
12/18/19	16:08	12/18/19 16:08	8.96
12/18/19	16:37	12/18/19 16:37	8.89
12/19/19	8:44	12/19/19 8:44	8.92

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID-	**MW-45-095**
Well being tested-	**RB-5**
Distance from monitoring point to testing well -	**~ 137'**
Task-	**Specific Capacity**

Date	Time	Date+Time	Depth to Water
12/16/19	13:25	12/16/19 13:25	16.04
12/17/19	7:38	12/17/19 7:38	16.09
12/17/19	9:04	12/17/19 9:04	16.21
12/17/19	11:14	12/17/19 11:14	16.26
12/17/19	12:22	12/17/19 12:22	16.32
12/17/19	13:22	12/17/19 13:22	16.17
12/17/19	14:22	12/17/19 14:22	16.38
12/17/19	15:17	12/17/19 15:17	16.59
12/17/19	16:21	12/17/19 16:21	16.61
12/18/19	7:26	12/18/19 7:26	16.14

MW-34-55 During RB-5 Lower Screen (64-89 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Pump was unstable throughout test. Flow rate was adjusted when needed.
Distance to RB-5: ~123 Feet
Legend
Transducer
Manual
Inconsistent Pumping Rate
Recovery Data
Depth to Water (feet)
8.2
8.4
8.6
8.8
9
9.2
9.4
Step 1:
Total Volume Pumped: 3213.6 gal
Avg. Flow Rate: 25.87 gpm
Drawdown in RB-5: 2.29 ft
Specific Capacity: 11.30 gpm/ft
Step 2:
Total Volume Pumped: 6094.5 gal
Avg. Flow Rate: 50.52 gpm
Drawdown in RB-5: 4.84 ft
Specific Capacity: 10.44 gpm/ft
Step 3:
Total Volume Pumped: 8981.8 gal
Avg. Flow Rate: 74.76 gpm
Drawdown in RB-5: 6.84 ft
Specific Capacity: 10.93 gpm/ft
Step 4:
Total Volume Pumped: 12163.2 gal
Avg. Flow Rate: 101.37 gpm
Drawdown in RB-5: 9.24 ft
Specific Capacity: 10.97 gpm/ft
12/17/19 6:00
12/17/19 9:00
12/17/19 12:00
12/17/19 15:00
12/17/19 18:00
Date and Time

MW-34-080 During RB-5 Lower Screen (64-89 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Pump was unstable throughout test. Flow rate was adjusted when needed.
Distance to RB-5: ~116 Feet
Legend
Transducer
Manual
Inconsistent Pumping Rate
Recovery Data
Depth to Water (feet)
8.2
8.4
8.6
8.8
9
9.2
9.4
9.6
9.8
12/17/19 6:00
12/17/19 9:00
12/17/19 12:00
12/17/19 15:00
12/17/19 18:00
Date and Time
Step 1:
Total Volume Pumped: 3213.6 gal
Avg. Flow Rate: 25.87 gpm
Drawdown in RB-5: 2.29 ft
Specific Capacity: 11.30 gpm/ft
Step 2:
Total Volume Pumped: 6094.5 gal
Avg. Flow Rate: 50.52 gpm
Drawdown in RB-5: 4.84 ft
Specific Capacity: 10.44 gpm/ft
Step 3:
Total Volume Pumped: 8981.8 gal
Avg. Flow Rate: 74.76 gpm
Drawdown in RB-5: 6.84 ft
Specific Capacity: 10.93 gpm/ft
Step 4:
Total Volume Pumped: 12163.2 gal
Avg. Flow Rate: 101.37 gpm
Drawdown in RB-5: 9.24 ft
Specific Capacity: 10.97 gpm/ft

MW-34-100 During RB-5 Lower Screen (64-89 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Pump was unstable throughout test. Flow rate was adjusted when needed.
Distance to RB-5: ~113 Feet
Legend
Transducer
Manual
Inconsistent Pumping Rate
Recovery Data
Depth to Water (feet)
8.4
8.6
8.8
9
9.2
9.4
9.6
9.8
12/17/19 6:00
12/17/19 9:00
12/17/19 12:00
12/17/19 15:00
12/17/19 18:00
Date and Time
Step 1:
Total Volume Pumped: 3213.6 gal
Avg. Flow Rate: 25.87 gpm
Drawdown in RB-5: 2.29 ft
Specific Capacity: 11.30 gpm/ft
Step 2:
Total Volume Pumped: 6094.5 gal
Avg. Flow Rate: 50.52 gpm
Drawdown in RB-5: 4.84 ft
Specific Capacity: 10.44 gpm/ft
Step 3:
Total Volume Pumped: 8981.8 gal
Avg. Flow Rate: 74.76 gpm
Drawdown in RB-5: 6.84 ft
Specific Capacity: 10.93 gpm/ft
Step 4:
Total Volume Pumped: 12163.2 gal
Avg. Flow Rate: 101.37 gpm
Drawdown in RB-5: 9.24 ft
Specific Capacity: 10.97 gpm/ft

MW-45-095 During RB-5 Lower Screen (64-89 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Pump was unstable throughout test. Flow rate was adjusted when needed.
Distance to RB-5: ~137 Feet
Legend
Transducer
Manual
Recovery Data
Inconsistent Pumping Rate
Depth to Water (feet)
15.6
15.8
16.0
16.2
16.4
16.6
16.8
17.0
12/17/19 6:00
12/17/19 9:00
12/17/19 12:00
12/17/19 15:00
12/17/19 18:00
Date and Time
Step 1:
Total Volume Pumped: 3213.6 gal
Avg. Flow Rate: 25.87 gpm
Drawdown in RB-5: 2.29 ft
Specific Capacity: 11.30 gpm/ft
Step 2:
Total Volume Pumped: 6094.5 gal
Avg. Flow Rate: 50.52 gpm
Drawdown in RB-5: 4.84 ft
Specific Capacity: 10.44 gpm/ft
Step 3:
Total Volume Pumped: 8981.8 gal
Avg. Flow Rate: 74.76 gpm
Drawdown in RB-5: 6.84 ft
Specific Capacity: 10.93 gpm/ft
Step 4:
Total Volume Pumped: 12163.2 gal
Avg. Flow Rate: 101.37 gpm
Drawdown in RB-5: 9.24 ft
Specific Capacity: 10.97 gpm/ft

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	**RB-5**
Date -	**12/18/2019**
Screened Interval Tested -	**Upper Screen (24-44 ft)**
Packer Set Depth -	**51-54 ft btoc**
Packer Seal Test -	Confirmed packer to be watertight before test
Tests Conducted -	4 step Specific Capacity Test (7.5, 15, 22.5, and 30 GPM) Respectfully
Purpose -	Well Performance Test
Summary -	Specific Capacity: 7.25-8.20 GPM/FT
Notes -	
	Inconsistant pumping rate at start of Step 1 and Step 3.
	Generator pulsing causing flow rate change towards ending of Step 1, Step 2 and Step 4.
	Generator failure at end of Step 4.
	Possible data drift in monitoring point MW-34-080.
Oversight Signature -	
Date -	1/2/2020

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	**RB-5**
Date -	**12/18/2019**
Screened Interval -	**24' - 44' bgs**
Pump Depth (ft btoc) -	**42**
Packer Depth (ft btoc) -	**51**
Packer Leak Test (Pass/Fail) -	**Pass**
Initial Water Level Within Screen Interval 24' - 44' -	**12.65**
Initial Water Level Within Screen Interval 64' - 89' -	**12.65**
Initial Totalizer Reading (gal) -	**0**
Final Totalizer Reading (gal) -	**8926**
Approx. Pumped Volume (gal) -	**8926**
Calculated Volume Purged (gal) -	**8892.47**
Differnce in volume Pumped vs. Calculated -	**33.53**
Number of Specific Capacity Steps -	**4**
Pumping Rates (List In Order) -	**7.5, 15, 22.5, and 30 GPM Respectfully**

Step 1						
Time (HR:MN:SEC)	Change in Time between Measurements (Min)	Elapsed Time (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)
8:30:00	0	0	8.22	0.00	12.64	-0.01
8:30:20	0.3	0.33	3.32	1.11	13.82	1.17
8:30:40	0.3	0.67	3.60	2.31	13.60	0.95
8:31:00	0.3	1.00	4.48	3.80	13.89	1.24
8:32:00	1.0	2.00	7.80	11.60	14.26	1.61
8:33:00	1.0	3.00	7.26	18.86	13.95	1.30
8:34:00	1.0	4.00	8.51	27.37	13.88	1.23
8:35:00	1.0	5.00	8.72	36.09	13.90	1.25
8:36:00	1.0	6.00	8.97	45.06	13.90	1.25
8:37:00	1.0	7.00	9.10	54.16	13.87	1.22
8:38:00	1.0	8.00	9.21	63.37	13.79	1.14
8:39:00	1.0	9.00	8.00	71.37	13.77	1.12
8:40:00	1.0	10.00	7.85	79.22	13.75	1.10
8:42:00	2.0	12.00	7.89	95.00	13.75	1.10
8:44:00	2.0	14.00	6.76	108.52	13.75	1.10
8:46:00	2.0	16.00	7.96	124.44	13.73	1.08
8:48:00	2.0	18.00	8.10	140.64	13.73	1.08
8:50:00	2.0	20.00	8.16	156.96	13.73	1.08
8:52:00	2.0	22.00	8.20	173.36	13.75	1.10
8:54:00	2.0	24.00	8.24	189.84	13.75	1.10
8:56:00	2.0	26.00	8.21	206.26	13.75	1.10
8:58:00	2.0	28.00	8.21	222.68	13.75	1.10
9:00:00	2.0	30.00	8.28	239.24	13.75	1.10
9:05:00	5.0	35.00	8.26	280.54	13.75	1.10
9:10:00	5.0	40.00	8.28	321.94	13.75	1.10
9:15:00	5.0	45.00	8.30	363.44	13.75	1.10
9:20:00	5.0	50.00	8.34	405.14	13.75	1.10
9:25:00	5.0	55.00	8.33	446.79	13.75	1.10
9:30:00	5.0	60.00	8.30	488.29	13.75	1.10
9:40:00	10.0	70.00	8.34	571.69	13.75	1.10
9:50:00	10.0	80.00	8.34	655.09	13.75	1.10
10:00:00	10.0	90.00	8.34	738.49	13.75	1.10
10:10:00	10.0	100.00	8.36	822.09	13.75	1.10
10:20:00	10.0	110.00	7.58	897.89	13.61	0.96
10:30:00	10.0	120.00	9.58	993.69	13.61	0.96
Total Volume Pumped for Step 1 (GAL):			993.69			
Average Pumping Rate (GPM):			7.87			
Specific Capacity (GPM/FT):			8.20			

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	RB-5
Date -	12/18/2019
Screened Interval -	24' - 44' bgs
Pump Depth (ft btoc) -	42
Packer Depth (ft btoc) -	51
Packer Leak Test (Pass/Fail) -	Pass
Initial Water Level Within Screen Interval 24' - 44' -	12.65
Initial Water Level Within Screen Interval 64' - 89' -	12.65
Initial Totalizer Reading (gal) -	0
Final Totalizer Reading (gal) -	8926
Approx. Pumped Volume (gal) -	8926
Calculated Volume Purged (gal) -	8892.47
Differnce in volume Pumped vs. Calculated -	33.53
Number of Specific Capacity Steps -	4
Pumping Rates (List In Order) -	7.5, 15, 22.5, and 30 GPM Respectfully

Step 2							
Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 2 Start (Min)
10:30:20	0.3	120.33	10.67	997.25	13.82	1.17	0.33
10:30:40	0.3	120.67	11.94	1001.23	13.95	1.30	0.67
10:31:00	0.3	121.00	13.37	1005.68	14.50	1.85	1.00
10:32:00	1.0	122.00	15.62	1021.30	14.57	1.92	2.00
10:33:00	1.0	123.00	15.24	1036.54	14.58	1.93	3.00
10:34:00	1.0	124.00	15.26	1051.80	14.59	1.94	4.00
10:35:00	1.0	125.00	15.26	1067.06	14.59	1.94	5.00
10:36:00	1.0	126.00	15.28	1082.34	14.59	1.94	6.00
10:37:00	1.0	127.00	15.29	1097.63	14.59	1.94	7.00
10:38:00	1.0	128.00	15.29	1112.92	14.60	1.95	8.00
10:39:00	1.0	129.00	15.29	1128.21	14.60	1.95	9.00
10:40:00	1.0	130.00	15.31	1143.52	14.60	1.95	10.00
10:42:00	2.0	132.00	15.31	1174.14	14.60	1.95	12.00
10:44:00	2.0	134.00	15.34	1204.82	14.61	1.96	14.00
10:46:00	2.0	136.00	15.32	1235.46	14.61	1.96	16.00
10:48:00	2.0	138.00	15.32	1266.10	14.61	1.96	18.00
10:50:00	2.0	140.00	15.32	1296.74	14.61	1.96	20.00
10:52:00	2.0	142.00	15.34	1327.42	14.61	1.96	22.00
10:54:00	2.0	144.00	15.34	1358.10	14.61	1.96	24.00
10:56:00	2.0	146.00	15.36	1388.82	14.61	1.96	26.00
10:58:00	2.0	148.00	15.34	1419.50	14.61	1.96	28.00
11:00:00	2.0	150.00	15.34	1450.18	14.61	1.96	30.00
11:05:00	5.0	155.00	15.36	1526.98	14.61	1.96	35.00
11:10:00	5.0	160.00	15.38	1603.88	14.61	1.96	40.00
11:15:00	5.0	165.00	15.39	1680.83	14.61	1.96	45.00
11:20:00	5.0	170.00	15.41	1757.88	14.61	1.96	50.00
11:25:00	5.0	175.00	15.41	1834.93	14.61	1.96	55.00
11:30:00	5.0	180.00	15.42	1912.03	14.61	1.96	60.00
11:40:00	10.0	190.00	15.39	2065.93	14.61	1.96	70.00
11:50:00	10.0	200.00	15.41	2220.03	14.61	1.96	80.00
12:00:00	10.0	210.00	15.41	2374.13	14.61	1.96	90.00
12:10:00	10.0	220.00	15.44	2528.53	14.61	1.96	100.00
12:20:00	10.0	230.00	15.64	2684.93	14.79	2.14	110.00
12:30:00	10.0	240.00	15.88	2843.73	14.73	2.08	120.00

Total Volume Pumped for Step 2 (GAL):	1850.04
Average Pumping Rate (GPM):	15.08
Specific Capacity (GPM/FT):	7.25

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	RB-5
Date -	12/18/2019
Screened Interval -	24' - 44' bgs
Pump Depth (ft btoc) -	42
Packer Depth (ft btoc) -	51
Packer Leak Test (Pass/Fail) -	Pass
Initial Water Level Within Screen Interval 24' - 44' -	12.65
Initial Water Level Within Screen Interval 64' - 89' -	12.65
Initial Totalizer Reading (gal) -	0
Final Totalizer Reading (gal) -	8926
Approx. Pumped Volume (gal) -	8926
Calculated Volume Purged (gal) -	8892.47
Differnce in volume Pumped vs. Calculated -	33.53
Number of Specific Capacity Steps -	4
Pumping Rates (List In Order) -	7.5, 15, 22.5, and 30 GPM Respectfully

Step 3							
Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 3 Start (Min)
12:30:20	0.3	240.33	25.04	2852.08	15.32	2.67	0.33
12:30:40	0.3	240.67	23.41	2859.88	15.52	2.87	0.67
12:31:00	0.3	241.00	22.34	2867.33	15.49	2.84	1.00
12:32:00	1.0	242.00	22.41	2889.74	15.47	2.82	2.00
12:33:00	1.0	243.00	22.74	2912.48	15.53	2.88	3.00
12:34:00	1.0	244.00	22.74	2935.22	15.54	2.89	4.00
12:35:00	1.0	245.00	22.81	2958.03	15.54	2.89	5.00
12:36:00	1.0	246.00	22.81	2980.84	15.54	2.89	6.00
12:37:00	1.0	247.00	22.81	3003.65	15.54	2.89	7.00
12:38:00	1.0	248.00	22.82	3026.47	15.55	2.90	8.00
12:39:00	1.0	249.00	22.86	3049.33	15.55	2.90	9.00
12:40:00	1.0	250.00	22.86	3072.19	15.55	2.90	10.00
12:42:00	2.0	252.00	22.91	3118.01	15.55	2.90	12.00
12:44:00	2.0	254.00	22.91	3163.83	15.55	2.90	14.00
12:46:00	2.0	256.00	22.92	3209.67	15.55	2.90	16.00
12:48:00	2.0	258.00	22.94	3255.55	15.55	2.90	18.00
12:50:00	2.0	260.00	22.92	3301.39	15.55	2.90	20.00
12:52:00	2.0	262.00	22.92	3347.23	15.55	2.90	22.00
12:54:00	2.0	264.00	22.74	3392.71	15.55	2.90	24.00
12:56:00	2.0	266.00	22.90	3438.51	15.55	2.90	26.00
12:58:00	2.0	268.00	22.92	3484.35	15.55	2.90	28.00
13:00:00	2.0	270.00	22.92	3530.19	15.55	2.90	30.00
13:05:00	5.0	275.00	22.96	3644.99	15.55	2.90	35.00
13:10:00	5.0	280.00	22.96	3759.79	15.56	2.91	40.00
13:15:00	5.0	285.00	23.01	3874.84	15.56	2.91	45.00
13:20:00	5.0	290.00	22.99	3989.79	15.56	2.91	50.00
13:25:00	5.0	295.00	23.02	4104.89	15.56	2.91	55.00
13:30:00	5.0	300.00	23.02	4219.99	15.56	2.91	60.00
13:40:00	10.0	310.00	23.04	4450.39	15.56	2.91	70.00
13:50:00	10.0	320.00	23.09	4681.29	15.57	2.92	80.00
14:00:00	10.0	330.00	23.08	4912.09	15.56	2.91	90.00
14:10:00	10.0	340.00	23.08	5142.89	15.57	2.92	100.00
14:20:00	10.0	350.00	23.11	5373.99	15.57	2.92	110.00
14:30:00	10.0	360.00	23.11	5605.09	15.57	2.92	120.00
Total Volume Pumped for Step 3 (GAL):			2761.36				
Average Pumping Rate (GPM):			22.97				
Specific Capacity (GPM/FT):			7.87				

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity Testing

Location/Well ID-	RB-5
Date -	12/18/2019
Screened Interval -	24' - 44' bgs
Pump Depth (ft btoc) -	42
Packer Depth (ft btoc) -	51
Packer Leak Test (Pass/Fail) -	Pass
Initial Water Level Within Screen Interval 24' - 44' -	12.65
Initial Water Level Within Screen Interval 64' - 89' -	12.65
Initial Totalizer Reading (gal) -	0
Final Totalizer Reading (gal) -	8926
Approx. Pumped Volume (gal) -	8926
Calculated Volume Purged (gal) -	8892.47
Differnce in volume Pumped vs. Calculated -	33.53
Number of Specific Capacity Steps -	4
Pumping Rates (List In Order) -	7.5, 15, 22.5, and 30 GPM Respectfully

Step 4							
Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 4 Start (Min)
14:30:20	0.3	360.33	29.59	5614.95	15.84	3.19	0.33
14:30:40	0.3	360.67	30.12	5624.99	16.20	3.55	0.33
14:31:00	0.3	361.00	29.79	5634.92	16.29	3.64	0.67
14:32:00	1.0	362.00	30.19	5665.11	16.35	3.70	1.67
14:33:00	1.0	363.00	30.09	5695.20	16.39	3.74	2.67
14:34:00	1.0	364.00	29.84	5725.04	16.39	3.74	3.67
14:35:00	1.0	365.00	29.76	5754.80	16.38	3.73	4.67
14:36:00	1.0	366.00	29.94	5784.74	16.38	3.73	5.67
14:37:00	1.0	367.00	29.96	5814.70	16.38	3.73	6.67
14:38:00	1.0	368.00	29.94	5844.64	16.38	3.73	7.67
14:39:00	1.0	369.00	30.36	5875.00	16.42	3.77	8.67
14:40:00	1.0	370.00	30.40	5905.40	16.42	3.77	9.67
14:42:00	2.0	372.00	30.44	5966.28	16.42	3.77	11.67
14:44:00	2.0	374.00	30.44	6027.16	16.42	3.77	13.67
14:46:00	2.0	376.00	30.12	6087.40	16.39	3.74	15.67
14:48:00	2.0	378.00	29.94	6147.28	16.38	3.73	17.67
14:50:00	2.0	380.00	29.94	6207.16	16.38	3.73	19.67
14:52:00	2.0	382.00	29.96	6267.08	16.38	3.73	21.67
14:54:00	2.0	384.00	29.97	6327.02	16.38	3.73	23.67
14:56:00	2.0	386.00	29.96	6386.94	16.38	3.73	25.67
14:58:00	2.0	388.00	29.97	6446.88	16.38	3.73	27.67
15:00:00	2.0	390.00	29.97	6506.82	16.38	3.73	29.67
15:05:00	5.0	395.00	29.99	6656.77	16.38	3.73	34.67
15:10:00	5.0	400.00	30.00	6806.77	16.38	3.73	39.67
15:15:00	5.0	405.00	29.97	6956.62	16.38	3.73	44.67
15:20:00	5.0	410.00	29.97	7106.47	16.38	3.73	49.67
15:25:00	5.0	415.00	29.99	7256.42	16.38	3.73	54.67
15:30:00	5.0	420.00	29.99	7406.37	16.38	3.73	59.67
15:40:00	10.0	430.00	29.96	7705.97	16.38	3.73	69.67
15:50:00	10.0	440.00	29.92	8005.17	16.38	3.73	79.67
16:00:00	10.0	450.00	29.96	8304.77	16.38	3.73	89.67
16:10:00	10.0	460.00	28.40	8588.77	--	--	99.67
16:20:00	10.0	470.00	30.37	8892.47	15.40	2.75	109.67
16:26:00	6.0	476.00	Test Complete				

Total Volume Pumped for Step 4 (GAL):	3287.38
Average Pumping Rate (GPM):	29.98
Specific Capacity (GPM/FT):	8.04

RB-5 Upper Screen (24-44 ft) Linear Drawdown Plot
Drawdown (feet)
Elapsed Time (min)
0
0.5
1
1.5
2
2.5
3
3.5
4
0
100
200
300
400
500
600
Step 1:
Total Volume Pumped: 993.69 gal
Avg. Flow Rate: 7.87 gpm
Drawdown: 0.96 ft
Specific Capacity: 8.20 gpm/ft
Generator pulsing causing flow rate change
Step 2:
Total Volume Pumped: 1850.04 gal
Avg. Flow Rate: 15.08 gpm
Drawdown: 2.08 ft
Specific Capacity: 7.25 gpm/ft
Generator pulsing causing flow rate change
Inconsistent Pumping Rate
Step 3:
Total Volume Pumped: 2761.36 gal
Avg. Flow Rate: 22.97 gpm
Drawdown: 2.92 ft
Specific Capacity: 7.87 gpm/ft
Step 4:
Total Volume Pumped: 3287.38 gal
Avg. Flow Rate: 29.98 gpm
Drawdown: 16.38 ft
Specific Capacity: 8.04 gpm/ft
Recovery Data
Generator failure
Legend
Transducer
Manual

RB-5 Upper Screen (24-44 ft)
Semi-Log Drawdown Plot

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID-	**MW-34-55**
Well being tested-	**RB-5**
Distance from monitoring point to testing well -	**~ 123'**
Task-	**Specific Capacity**

Date	Time	Date+Time	Depth to Water
12/16/19	12:45	12/16/19 12:45	8.36
12/17/19	7:32	12/17/19 7:32	8.41
12/17/19	9:11	12/17/19 9:11	8.53
12/17/19	11:17	12/17/19 11:17	8.66
12/17/19	12:27	12/17/19 12:27	8.70
12/17/19	13:26	12/17/19 13:26	8.75
12/17/19	14:27	12/17/19 14:27	8.80
12/17/19	15:20	12/17/19 15:20	8.95
12/17/19	16:25	12/17/19 16:25	8.96
12/18/19	7:30	12/18/19 7:30	8.51
12/18/19	9:07	12/18/19 9:07	8.53
12/18/19	10:16	12/18/19 10:16	8.54
12/18/19	11:13	12/18/19 11:13	8.58
12/18/19	12:17	12/18/19 12:17	8.57
12/18/19	13:08	12/18/19 13:08	8.60
12/18/19	14:18	12/18/19 14:18	8.62
12/18/19	15:08	12/18/19 15:08	8.66
12/18/19	16:07	12/18/19 16:07	8.65
12/18/19	16:39	12/18/19 16:39	8.55
12/19/19	8:47	12/19/19 8:47	8.58

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID-	**MW-34-80**
Well being tested-	**RB-5**
Distance from monitoring point to testing well -	**~ 116'**
Task-	**Specific Capacity**

Date	Time	Date+Time	Depth to Water
12/16/19	12:44	12/16/19 12:44	8.52
12/17/19	7:31	12/17/19 7:31	8.61
12/17/19	9:10	12/17/19 9:10	8.73
12/17/19	11:18	12/17/19 11:18	8.88
12/17/19	12:26	12/17/19 12:26	8.92
12/17/19	13:27	12/17/19 13:27	8.96
12/17/19	14:26	12/17/19 14:26	9.03
12/17/19	15:21	12/17/19 15:21	9.22
12/17/19	16:25	12/17/19 16:25	9.23
12/18/19	7:29	12/18/19 7:29	8.67
12/18/19	9:06	12/18/19 9:06	8.71
12/18/19	10:16	12/18/19 10:16	8.71
12/18/19	11:12	12/18/19 11:12	8.74
12/18/19	12:17	12/18/19 12:17	8.74
12/18/19	13:07	12/18/19 13:07	8.74
12/18/19	14:17	12/18/19 14:17	8.75
12/18/19	15:07	12/18/19 15:07	9.22
12/18/19	16:07	12/18/19 16:07	8.82
12/18/19	16:38	12/18/19 16:38	8.71
12/19/19	8:46	12/19/19 8:46	8.76

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID-	**MW-34-100**
Well being tested-	**RB-5**
Distance from monitoring point to testing well -	**~ 113'**
Task-	**Specific Capacity**

Date	Time	Date+Time	Depth to Water
12/16/19	12:39	12/16/19 12:39	8.69
12/17/19	7:30	12/17/19 7:30	8.77
12/17/19	9:08	12/17/19 9:08	8.92
12/17/19	11:19	12/17/19 11:19	9.06
12/17/19	12:26	12/17/19 12:26	9.11
12/17/19	13:28	12/17/19 13:28	9.12
12/17/19	14:25	12/17/19 14:25	9.21
12/17/19	15:22	12/17/19 15:22	9.41
12/17/19	16:24	12/17/19 16:24	9.43
12/18/19	7:28	12/18/19 7:28	8.84
12/18/19	9:05	12/18/19 9:05	8.87
12/18/19	10:17	12/18/19 10:17	8.87
12/18/19	11:11	12/18/19 11:11	8.89
12/18/19	12:18	12/18/19 12:18	8.90
12/18/19	13:06	12/18/19 13:06	8.92
12/18/19	14:16	12/18/19 14:16	8.94
12/18/19	15:06	12/18/19 15:06	8.97
12/18/19	16:08	12/18/19 16:08	8.96
12/18/19	16:37	12/18/19 16:37	8.89
12/19/19	8:44	12/19/19 8:44	8.92

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID-	**MW-42-30**
Well being tested-	**RB-5**
Distance from monitoring point to testing well -	**~ 140'**
Task-	**Specific Capacity**

Date	Time	Date+Time	Depth to Water
12/18/19	7:30	12/18/19 7:30	11.60
12/18/19	9:03	12/18/19 9:03	11.60
12/18/19	10:13	12/18/19 10:13	11.60
12/18/19	11:08	12/18/19 11:08	11.62
12/18/19	12:14	12/18/19 12:14	11.64
12/18/19	13:03	12/18/19 13:03	11.66
12/18/19	14:13	12/18/19 14:13	11.68
12/18/19	15:03	12/18/19 15:03	11.70
12/18/19	16:04	12/18/19 16:04	11.71
12/18/19	16:34	12/18/19 16:34	11.66
12/19/19	8:23	12/19/19 8:23	11.67

ARCADIS Design & Consultancy for natural and built assets

Specific Capacity/Injection Test Monitoring Point

Location/Well ID-	**MW-45-095**
Well being tested-	**RB-5**
Distance from monitoring point to testing well -	**~ 137'**
Task-	**Specific Capacity**

Date	Time	Date+Time	Depth to Water
12/16/19	13:25	12/16/19 13:25	16.04
12/17/19	7:38	12/17/19 7:38	16.09
12/17/19	9:04	12/17/19 9:04	16.21
12/17/19	11:14	12/17/19 11:14	16.26
12/17/19	12:22	12/17/19 12:22	16.32
12/17/19	13:22	12/17/19 13:22	16.17
12/17/19	14:22	12/17/19 14:22	16.38
12/17/19	15:17	12/17/19 15:17	16.59
12/17/19	16:21	12/17/19 16:21	16.61
12/18/19	7:26	12/18/19 7:26	16.14

MW-34-55 During RB-5 Upper Screen (24-44 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Distance to RB-5: ~123 Feet
Legend
Transducer
Manual
Inconsistent Pumping Rate
Generator pulsing causing flow rate change
Generator pulsing causing flow rate change
Generator failure
Recovery Data
Depth to Water (feet)
8
8.2
8.4
8.6
8.8
9
9.2
12/18/19 6:00
12/18/19 9:00
12/18/19 12:00
12/18/19 15:00
12/18/19 18:00
Date and Time
Step 1:
Total Volume Pumped: 993.69 gal
Avg. Flow Rate: 7.87 gpm
Drawdown in RB-5: 0.96 ft
Specific Capacity: 8.20 gpm/ft
Step 2:
Total Volume Pumped: 1850.04 gal
Avg. Flow Rate: 15.08 gpm
Drawdown in RB-5: 2.08 ft
Specific Capacity: 7.25 gpm/ft
Step 3:
Total Volume Pumped: 2761.36 gal
Avg. Flow Rate: 22.97 gpm
Drawdown in RB-5: 2.92 ft
Specific Capacity: 7.87 gpm/ft
Step 4:
Total Volume Pumped: 3287.38 gal
Avg. Flow Rate: 29.98 gpm
Drawdown in RB-5: 16.38 ft
Specific Capacity: 8.04 gpm/ft

MW-34-080 During RB-5 Upper Screen (24-44 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Distance to RB-5: ~116 Feet
Legend
Transducer
Manual
Inconsistent Pumping Rate
Possible Data Drift
Generator pulsing causing flow rate change
Generator pulsing causing flow rate change
Generator failure
Recovery Data
Anomaly
Depth to Water (feet)
8.2
8.4
8.6
8.8
9
9.2
9.4
9.6
12/18/19 6:00
12/18/19 9:00
12/18/19 12:00
12/18/19 15:00
12/18/19 18:00
Date and Time
Step 1:
Total Volume Pumped: 993.69 gal
Avg. Flow Rate: 7.87 gpm
Drawdown in RB-5: 0.96 ft
Specific Capacity: 8.20 gpm/ft
Step 2:
Total Volume Pumped: 1850.04 gal
Avg. Flow Rate: 15.08 gpm
Drawdown in RB-5: 2.08 ft
Specific Capacity: 7.25 gpm/ft
Step 3:
Total Volume Pumped: 2761.36 gal
Avg. Flow Rate: 22.97 gpm
Drawdown in RB-5: 2.92 ft
Specific Capacity: 7.87 gpm/ft
Step 4:
Total Volume Pumped: 3287.38 gal
Avg. Flow Rate: 29.98 gpm
Drawdown in RB-5: 16.38 ft
Specific Capacity: 8.04 gpm/ft

MW-34-100 During RB-5 Upper Screen (24-44 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Distance to RB-5: ~113 Feet
Legend
Transducer
Manual
Inconsistent Pumping Rate
Generator pulsing causing flow rate change
Generator pulsing causing flow rate change
Generator failure
Recovery Data
Depth to Water (feet)
8.2
8.4
8.6
8.8
9
9.2
9.4
9.6
9.8
12/18/19 6:00
12/18/19 9:00
12/18/19 12:00
12/18/19 15:00
12/18/19 18:00
Date and Time
Step 1:
Total Volume Pumped: 993.69 gal
Avg. Flow Rate: 7.87 gpm
Drawdown in RB-5: 0.96 ft
Specific Capacity: 8.20 gpm/ft
Step 2:
Total Volume Pumped: 1850.04 gal
Avg. Flow Rate: 15.08 gpm
Drawdown in RB-5: 2.08 ft
Specific Capacity: 7.25 gpm/ft
Step 3:
Total Volume Pumped: 2761.36 gal
Avg. Flow Rate: 22.97 gpm
Drawdown in RB-5: 2.92 ft
Specific Capacity: 7.87 gpm/ft
Step 4:
Total Volume Pumped: 3287.38 gal
Avg. Flow Rate: 29.98 gpm
Drawdown in RB-5: 16.38 ft
Specific Capacity: 8.04 gpm/ft

MW-42-030 During RB-5 Upper Screen (24-44 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Distance to RB-5: ~140 Feet
Legend
Transducer
Manual
Inconsistent Pumping Rate
Generator pulsing causing flow rate change
Generator pulsing causing flow rate change
Generator failure
Recovery Data
Depth to Water (feet)
11.4
11.5
11.6
11.7
11.8
11.9
12
12/18/19 6:00
12/18/19 9:00
12/18/19 12:00
12/18/19 15:00
12/18/19 18:00
Date and Time
Step 1:
Total Volume Pumped: 993.7 gal
Avg. Flow Rate: 7.87 gpm
Drawdown in RB-5: 0.96 ft
Specific Capacity: 8.20 gpm/ft
Step 2:
Total Volume Pumped: 1850.0 gal
Avg. Flow Rate: 15.08 gpm
Drawdown in RB-5: 2.08 ft
Specific Capacity: 7.25 gpm/ft
Step 3:
Total Volume Pumped: 2761.4 gal
Avg. Flow Rate: 22.97 gpm
Drawdown in RB-5: 2.92 ft
Specific Capacity: 7.87 gpm/ft
Step 4:
Total Volume Pumped: 3287.4 gal
Avg. Flow Rate: 29.98 gpm
Drawdown in RB-5: 16.38 ft
Specific Capacity: 8.04 gpm/ft

MW-45-95 During RB-5 Upper Screen (24-44 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Manual water levels not collected during test.
Distance to RB-5: ~137 Feet
Legend
Transducer
Manual
Inconsistent Pumping Rate
Generator pulsing causing flow rate change
Generator pulsing causing flow rate change
Generator failure
Recovery Data
Step 1:
Total Volume Pumped: 993.7 gal
Avg. Flow Rate: 7.87 gpm
Drawdown in RB-5: 0.96 ft
Specific Capacity: 8.20 gpm/ft
Step 2:
Total Volume Pumped: 1850.0 gal
Avg. Flow Rate: 15.08 gpm
Drawdown in RB-5: 2.08 ft
Specific Capacity: 7.25 gpm/ft
Step 3:
Total Volume Pumped: 2761.4 gal
Avg. Flow Rate: 22.97 gpm
Drawdown in RB-5: 2.92 ft
Specific Capacity: 7.87 gpm/ft
Step 4:
Total Volume Pumped: 3287.4 gal
Avg. Flow Rate: 29.98 gpm
Drawdown in RB-5: 16.38 ft
Specific Capacity: 8.04 gpm/ft
Depth to Water (feet)
15.6
15.8
16.0
16.2
16.4
16.6
16.8
17.0
12/18/19 6:00
12/18/19 9:00
12/18/19 12:00
12/18/19 15:00
12/18/19 18:00
Date and Time

Injectivity Testing

Location/Well ID	**IRZ-17**
Date	**1/28/2020**
Screened Interval Tested	**Lower (137 to 167 ft bgs)**
Packer Set Depth	**91 to 95 ft btoc**
Packer Seal Test	Confirmed packer to be watertight before test
Tests Conducted	Four-step injectivity test (8.0, 15.1, 22.6, 30.2)
Purpose	Well performance test
Summary	Specific injectivity: 2.37 to 3.02 gpm/ft
Injection Water Source	Fresh water from construction water supply system
Notes	Fresh water tank refilled from ~10:50 to ~12:30
	Fresh water tank refilled from ~13:38 to ~13:54
	Flow rate was unstable due to a fluxuation in water levels within fresh water tank during Step 4
	Fresh water tank refilled from ~15:08 to ~15:20
	Possible transducer data drift at MW-82-046
Oversight Signature	
Date	2/24/2020

Acronyms & Abbreviations
bgs = below ground surface
btoc = below top of casing
ft = feet
gpm = gallons per minute

Injectivity Test

Location/Well ID	IRZ-17 (Lower)
Date	1/28/2020
Screened Interval	137 to 167 ft bgs
Injection Depth (ft btoc)	148.30
Packer Depth (ft btoc)	91.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 137' to 167' ft btoc	27.65
Initial Water Level Within 36' to 57' ft btoc	27.62
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	9063.76
Approx Injected Volume (gal)	9063.76
Calculated Volume Purged (gal)	9057.76
Difference in Volume Pumped vs. Calculated	6.00
Number of Specific Capacity Steps	4
Pumping Rates (in order)	8.0, 15.1, 22.6, 30.2 gpm

Step 1 - Time (HR:MN:SEC)	Elapsed Time (min)	Injection Rate (gpm)	Total Volume Injected (gal)	Depth to Water (ft)	Water Level Change (ft)
8:00:00	0.00	0.00	0.00	27.65	0.00
8:00:20	0.33	23.71	7.90	19.80	7.85
8:00:40	0.67	5.76	9.82	25.50	2.15
8:01:00	1.00	6.78	12.08	25.40	2.25
8:02:00	2.00	7.54	19.62	25.13	2.52
8:03:00	3.00	7.58	27.20	25.11	2.54
8:04:00	4.00	7.58	34.78	25.11	2.54
8:05:00	5.00	7.58	42.36	25.10	2.55
8:06:00	6.00	7.56	49.92	25.10	2.55
8:07:00	7.00	7.56	57.48	25.09	2.56
8:08:00	8.00	7.58	65.06	25.09	2.56
8:09:00	9.00	7.56	72.62	25.08	2.57
8:10:00	10.00	7.56	80.18	25.07	2.58
8:12:00	12.00	7.56	95.30	25.07	2.58
8:14:00	14.00	7.56	110.42	25.07	2.58
8:16:00	16.00	7.56	125.54	25.07	2.58
8:18:00	18.00	7.54	140.62	25.07	2.58
8:20:00	20.00	7.54	155.70	25.07	2.58
8:22:00	22.00	7.54	170.78	25.10	2.55
8:24:00	24.00	7.54	185.86	25.10	2.55
8:26:00	26.00	7.54	200.94	25.09	2.56
8:28:00	28.00	7.54	216.02	25.09	2.56
8:30:00	30.00	7.54	231.10	25.08	2.57
8:35:00	35.00	7.52	268.70	25.02	2.63
8:40:00	40.00	7.54	306.40	25.02	2.63
8:45:00	45.00	7.56	344.20	25.01	2.64
8:50:00	50.00	7.54	381.90	25.04	2.61
8:55:00	55.00	7.56	419.70	25.06	2.59
9:00:00	60.00	7.54	457.40	25.05	2.60
9:10:00	70.00	7.56	533.00	25.00	2.65
9:20:00	80.00	7.56	608.60	25.02	2.63
9:30:00	90.00	7.54	684.00	25.04	2.61
9:40:00	100.00	7.54	759.40	25.05	2.60
9:50:00	110.00	7.54	834.80	25.05	2.60
10:00:00	120.00	7.54	910.20	25.02	2.63
Total Volume Injected During Step (GAL):			910.20		
Average Injection Rate (GPM):			7.95		
Specific Injectivity (GPM/FT):			3.02		

Injectivity Test

Location/Well ID	IRZ-17 (Lower)
Date	1/28/2020
Screened Interval	137 to 167 ft bgs
Injection Depth (ft btoc)	148.30
Packer Depth (ft btoc)	91.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 137' to 167' ft btoc	27.65
Initial Water Level Within 36' to 57' ft btoc	27.62
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	9063.76
Approx Injected Volume (gal)	9063.76
Calculated Volume Purged (gal)	9057.76
Difference in Volume Pumped vs. Calculated	6.00
Number of Specific Capacity Steps	4
Pumping Rates (in order)	8.0, 15.1, 22.6, 30.2 gpm

Step 2 - Time (HR:MN:SEC)	Elapsed Time (min)	Injection Rate (gpm)	Total Volume Injected (gal)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 2 Start (min)
10:00:20	120.33	13.58	914.73	22.80	4.85	0.33
10:00:40	120.67	15.16	919.78	22.42	5.23	0.67
10:01:00	121.00	15.18	924.84	22.33	5.32	1.00
10:02:00	122.00	15.14	939.98	22.30	5.35	2.00
10:03:00	123.00	15.16	955.14	22.28	5.37	3.00
10:04:00	124.00	15.16	970.30	22.26	5.39	4.00
10:05:00	125.00	15.16	985.46	22.26	5.39	5.00
10:06:00	126.00	15.16	1000.62	22.25	5.40	6.00
10:07:00	127.00	15.16	1015.78	22.25	5.40	7.00
10:08:00	128.00	15.21	1030.99	22.24	5.41	8.00
10:09:00	129.00	15.21	1046.20	22.24	5.41	9.00
10:10:00	130.00	15.18	1061.38	22.23	5.42	10.00
10:12:00	132.00	15.18	1091.74	22.22	5.43	12.00
10:14:00	134.00	15.18	1122.10	22.20	5.45	14.00
10:16:00	136.00	15.18	1152.46	22.19	5.46	16.00
10:18:00	138.00	15.21	1182.88	22.16	5.49	18.00
10:20:00	140.00	15.18	1213.24	22.13	5.52	20.00
10:22:00	142.00	15.16	1243.56	22.13	5.52	22.00
10:24:00	144.00	15.18	1273.92	22.14	5.51	24.00
10:26:00	146.00	15.16	1304.24	22.14	5.51	26.00
10:28:00	148.00	15.16	1334.56	22.15	5.50	28.00
10:30:00	150.00	15.16	1364.88	22.14	5.51	30.00
10:35:00	155.00	15.16	1440.68	22.11	5.54	35.00
10:40:00	160.00	15.16	1516.48	22.11	5.54	40.00
10:45:00	165.00	15.16	1592.28	22.10	5.55	45.00
10:50:00	170.00	15.16	1668.08	22.11	5.54	50.00
10:55:00	175.00	15.16	1743.88	22.10	5.55	55.00
11:00:00	180.00	15.14	1819.58	22.10	5.55	60.00
11:10:00	190.00	15.14	1970.98	22.10	5.55	70.00
11:20:00	200.00	15.14	2122.38	22.10	5.55	80.00
11:30:00	210.00	15.14	2273.78	22.04	5.61	90.00
11:40:00	220.00	15.10	2424.78	22.01	5.64	100.00
11:50:00	230.00	15.12	2575.98	22.00	5.65	110.00
12:00:00	240.00	15.10	2726.98	21.99	5.66	120.00

Total Volume Injected During Step (GAL):	1816.78
Average Injection Rate (GPM):	15.11
Specific Injectivity (GPM/FT):	2.67

Injectivity Test

Location/Well ID	IRZ-17 (Lower)
Date	1/28/2020
Screened Interval	137 to 167 ft bgs
Injection Depth (ft btoc)	148.30
Packer Depth (ft btoc)	91.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 137' to 167' ft btoc	27.65
Initial Water Level Within 36' to 57' ft btoc	27.62
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	9063.76
Approx Injected Volume (gal)	9063.76
Calculated Volume Purged (gal)	9057.76
Difference in Volume Pumped vs. Calculated	6.00
Number of Specific Capacity Steps	4
Pumping Rates (in order)	8.0, 15.1, 22.6, 30.2 gpm

Step 3 - Time (HR:MN:SEC)	Elapsed Time (min)	Injection Rate (gpm)	Total Volume Injected (gal)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 3 Start (min)
12:00:20	240.33	22.02	2734.32	19.00	8.65	0.33
12:00:40	240.67	22.44	2741.80	19.15	8.50	0.67
12:01:00	241.00	22.46	2749.29	19.11	8.54	1.00
12:02:00	242.00	22.60	2771.89	19.02	8.63	2.00
12:03:00	243.00	22.60	2794.49	18.99	8.66	3.00
12:04:00	244.00	22.58	2817.07	18.98	8.67	4.00
12:05:00	245.00	22.64	2839.71	18.96	8.69	5.00
12:06:00	246.00	22.56	2862.27	18.95	8.70	6.00
12:07:00	247.00	22.51	2884.78	18.95	8.70	7.00
12:08:00	248.00	22.51	2907.29	18.95	8.70	8.00
12:09:00	249.00	22.53	2929.82	18.95	8.70	9.00
12:10:00	250.00	22.58	2952.40	18.91	8.74	10.00
12:12:00	252.00	22.56	2997.52	18.90	8.75	12.00
12:14:00	254.00	22.62	3042.76	18.88	8.77	14.00
12:16:00	256.00	22.64	3088.04	18.84	8.81	16.00
12:18:00	258.00	22.64	3133.32	18.84	8.81	18.00
12:20:00	260.00	22.64	3178.60	18.83	8.82	20.00
12:25:00	265.00	22.60	3291.60	18.82	8.83	25.00
12:28:00	268.00	22.62	3359.46	18.79	8.86	28.00
12:30:00	270.00	22.58	3404.62	18.80	8.85	30.00
12:35:00	275.00	22.56	3517.42	18.80	8.85	35.00
12:40:00	280.00	22.58	3630.32	18.79	8.86	40.00
12:45:00	285.00	22.56	3743.12	18.81	8.84	45.00
12:50:00	290.00	22.53	3855.77	18.83	8.82	50.00
12:55:00	295.00	22.56	3968.57	18.84	8.81	55.00
13:00:00	300.00	22.56	4081.37	18.83	8.82	60.00
13:10:00	310.00	22.53	4306.67	18.80	8.85	70.00
13:20:00	320.00	22.53	4531.97	18.74	8.91	80.00
13:30:00	330.00	22.53	4757.27	18.74	8.91	90.00
13:40:00	340.00	22.49	4982.17	18.70	8.95	100.00
13:50:00	350.00	22.56	5207.77	18.68	8.97	110.00
14:00:00	360.00	22.60	5433.77	18.63	9.02	120.00
Total Volume Injected During Step (GAL):			2706.79			
Average Injection Rate (GPM):			22.55			
Specific Injectivity (GPM/FT):			2.50			

Injectivity Test

Location/Well ID	IRZ-17 (Lower)
Date	1/28/2020
Screened Interval	137 to 167 ft bgs
Injection Depth (ft btoc)	148.30
Packer Depth (ft btoc)	91.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 137' to 167' ft btoc	27.65
Initial Water Level Within 36' to 57' ft btoc	27.62
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	9063.76
Approx Injected Volume (gal)	9063.76
Calculated Volume Purged (gal)	9057.76
Difference in Volume Pumped vs. Calculated	6.00
Number of Specific Capacity Steps	4
Pumping Rates (in order)	8.0, 15.1, 22.6, 30.2 gpm

Step 4 - Time (HR:MN:SEC)	Elapsed Time (min)	Injection Rate (gpm)	Total Volume Injected (gal)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 4 Start (min)
14:00:20	360.33	29.88	5443.73	15.60	12.05	0.33
14:00:40	360.67	30.37	5453.85	15.51	12.14	0.67
14:01:00	361.00	30.32	5463.96	15.47	12.18	1.00
14:02:00	362.00	30.26	5494.22	15.41	12.24	2.00
14:03:00	363.00	30.24	5524.46	15.40	12.25	3.00
14:04:00	364.00	30.20	5554.66	15.38	12.27	4.00
14:05:00	365.00	30.20	5584.86	15.38	12.27	5.00
14:06:00	366.00	30.22	5615.08	15.37	12.28	6.00
14:07:00	367.00	30.18	5645.26	15.37	12.28	7.00
14:08:00	368.00	30.16	5675.42	15.35	12.30	8.00
14:09:00	369.00	30.16	5705.58	15.35	12.30	9.00
14:10:00	370.00	30.16	5735.74	15.34	12.31	10.00
14:12:00	372.00	30.16	5796.06	15.32	12.33	12.00
14:14:00	374.00	30.20	5856.46	15.29	12.36	14.00
14:16:00	376.00	30.18	5916.82	15.28	12.37	16.00
14:18:00	378.00	30.18	5977.18	15.26	12.39	18.00
14:20:00	380.00	30.22	6037.62	15.24	12.41	20.00
14:22:00	382.00	30.20	6098.02	15.21	12.44	22.00
14:24:00	384.00	30.18	6158.38	15.20	12.45	24.00
14:26:00	386.00	30.20	6218.78	15.19	12.46	26.00
14:28:00	388.00	30.18	6279.14	15.18	12.47	28.00
14:30:00	390.00	30.16	6339.46	15.17	12.48	30.00
14:35:00	395.00	30.22	6490.56	15.09	12.56	35.00
14:40:00	400.00	30.20	6641.56	15.08	12.57	40.00
14:45:00	405.00	30.20	6792.56	15.06	12.59	45.00
14:50:00	410.00	30.20	6943.56	15.05	12.60	50.00
14:55:00	415.00	30.14	7094.26	15.04	12.61	55.00
15:00:00	420.00	30.16	7245.06	15.01	12.64	60.00
15:10:00	430.00	30.18	7546.86	14.98	12.67	70.00
15:20:00	440.00	30.29	7849.76	14.89	12.76	80.00
15:30:00	450.00	30.22	8151.96	14.91	12.74	90.00
15:40:00	460.00	30.18	8453.76	14.91	12.74	100.00
15:50:00	470.00	30.20	8755.76	14.90	12.75	110.00
16:00:00	480.00	30.20	9057.76	14.90	12.75	120.00
16:01:00	481.00	0.00	9057.76	26.80	0.85	121.00
16:02:00	482.00	0.00	9057.76	27.00	0.65	122.00
16:03:00	483.00	0.00	9057.76	27.13	0.52	123.00
16:04:00	484.00	0.00	9057.76	27.21	0.44	124.00
16:05:00	485.00	0.00	9057.76	27.24	0.41	125.00
16:06:00	486.00	0.00	9057.76	27.26	0.39	126.00
16:07:00	487.00	0.00	9057.76	27.29	0.36	127.00
16:08:00	488.00	0.00	9057.76	27.30	0.35	128.00
16:09:00	489.00	0.00	9057.76	27.31	0.34	129.00
16:10:00	490.00	0.00	9057.76	27.32	0.33	130.00

Total Volume Injected During Step (GAL):	3623.99
Average Injection Rate (GPM):	30.19
Specific Injectivity (GPM/FT):	2.37

Acronyms & Abbreviations
bgs = below ground surface
btoc = below top of casing
ft = feet
gal = gallons
gpm = gallons per minute
min = minutes

IRZ-17 Lower Screen (137 to 167 ft) Linear Change in Water Level Plot
Change in Water Level (feet)
Elapsed Time (min)
0
2
4
6
8
10
12
14
0
100
200
300
400
500
600
700
Legend
Transducer
Manual
Inconsistent Pumping
Fresh water tank refilled from ~10:50 to ~12:30
Fresh water tank refilled from ~13:38 to ~13:54
Flow rate was unstable due to a fluxuation in water levels within fresh water tank
Fresh water tank refilled from ~15:08 to ~15:20
Recovery
Step 1:
Total Volume Pumped: 910.20 gal
Avg. Flow Rate: 7.95 gpm
Change in Water Level: 2.63 ft
Specific Capacity: 3.02 gpm/ft
Step 2:
Total Volume Pumped: 1816.78 gal
Avg. Flow Rate: 15.11 gpm
Change in Water Level: 5.66 ft
Specific Capacity: 2.67 gpm/ft
Step 3:
Total Volume Pumped: 2706.79 gal
Avg. Flow Rate: 22.55 gpm
Change in Water Level: 9.02 ft
Specific Capacity: 2.50 gpm/ft
Step 4:
Total Volume Pumped: 3623.99 gal
Avg. Flow Rate: 30.19 gpm
Change in Water Level: 12.75 ft
Specific Capacity: 2.37 gpm/ft

IRZ-17 Lower Screen (137 to 167 ft) Semi-Log Change in Water Level Plot

Specific Capacity/
Injection Test Monitoring Point

Location/Well ID	**MW-31-060**
Well Being Tested	**IRZ-17**
Screened Interval of Well Being Tested	**137 to 167 ft bgs**
Approximate Distance from Testing Well	**136 ft**

Date	Time	Date and Time	Depth to Water
1/27/2020	14:24	1/27/20 14:24	42.54
1/27/2020	16:32	1/27/20 16:32	42.52
1/28/2020	7:45	1/28/20 7:45	42.50
1/28/2020	8:39	1/28/20 8:39	42.49
1/28/2020	9:46	1/28/20 9:46	42.47
1/28/2020	10:38	1/28/20 10:38	42.44
1/28/2020	11:45	1/28/20 11:45	42.41
1/28/2020	12:36	1/28/20 12:36	42.39
1/28/2020	13:45	1/28/20 13:45	42.36
1/28/2020	14:38	1/28/20 14:38	42.36
1/28/2020	15:46	1/28/20 15:46	42.33
1/28/2020	16:19	1/28/20 16:19	42.34
1/29/2020	7:40	1/29/20 7:40	42.35
1/29/2020	8:38	1/29/20 8:38	42.28
1/29/2020	9:47	1/29/20 9:47	42.25
1/29/2020	10:44	1/29/20 10:44	42.22
1/29/2020	11:48	1/29/20 11:48	42.20
1/29/2020	12:40	1/29/20 12:40	42.19
1/29/2020	13:48	1/29/20 13:48	42.16
1/29/2020	14:42	1/29/20 14:42	42.15
1/29/2020	15:48	1/29/20 15:48	42.18
1/29/2020	16:20	1/29/20 16:20	42.28
1/30/2020	8:55	1/30/20 8:55	42.51

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

Location/Well ID	**MW-31-135**
Well Being Tested	**IRZ-17**
Screened Interval of Well Being Tested	**137 to 167 ft bgs**
Approximate Distance from Testing Well	**173 ft**

Date	Time	Date and Time	Depth to Water
1/27/2020	14:23	1/27/20 14:23	43.99
1/27/2020	16:34	1/27/20 16:34	43.98
1/28/2020	7:46	1/28/20 7:46	43.86
1/28/2020	8:38	1/28/20 8:38	43.84
1/28/2020	9:47	1/28/20 9:47	43.84
1/28/2020	10:37	1/28/20 10:37	43.80
1/28/2020	11:47	1/28/20 11:47	43.79
1/28/2020	12:35	1/28/20 12:35	43.75
1/28/2020	13:47	1/28/20 13:47	43.72
1/28/2020	14:37	1/28/20 14:37	43.66
1/28/2020	15:47	1/28/20 15:47	43.63
1/28/2020	16:18	1/28/20 16:18	43.72
1/29/2020	7:41	1/29/20 7:41	43.70
1/29/2020	8:37	1/29/20 8:37	43.67
1/29/2020	9:48	1/29/20 9:48	43.70
1/29/2020	10:43	1/29/20 10:43	43.71
1/29/2020	11:49	1/29/20 11:49	43.74
1/29/2020	12:38	1/29/20 12:38	43.76
1/29/2020	13:49	1/29/20 13:49	43.78
1/29/2020	14:41	1/29/20 14:41	43.81
1/29/2020	15:49	1/29/20 15:49	43.89
1/29/2020	16:19	1/29/20 16:19	43.89
1/30/2020	8:54	1/30/20 8:54	44.02

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

Location/Well ID	**MW-31-135**
Well Being Tested	**IRZ-17**
Screened Interval of Well Being Tested	**137 to 167 ft bgs**
Approximate Distance from Testing Well	**173 ft**

Date	Time	Date and Time	Depth to Water
1/27/2020	14:23	1/27/20 14:23	43.99
1/27/2020	16:34	1/27/20 16:34	43.98
1/28/2020	7:46	1/28/20 7:46	43.86
1/28/2020	8:38	1/28/20 8:38	43.84
1/28/2020	9:47	1/28/20 9:47	43.84
1/28/2020	10:37	1/28/20 10:37	43.80
1/28/2020	11:47	1/28/20 11:47	43.79
1/28/2020	12:35	1/28/20 12:35	43.75
1/28/2020	13:47	1/28/20 13:47	43.72
1/28/2020	14:37	1/28/20 14:37	43.66
1/28/2020	15:47	1/28/20 15:47	43.63
1/28/2020	16:18	1/28/20 16:18	43.72
1/29/2020	7:41	1/29/20 7:41	43.70
1/29/2020	8:37	1/29/20 8:37	43.67
1/29/2020	9:48	1/29/20 9:48	43.70
1/29/2020	10:43	1/29/20 10:43	43.71
1/29/2020	11:49	1/29/20 11:49	43.74
1/29/2020	12:38	1/29/20 12:38	43.76
1/29/2020	13:49	1/29/20 13:49	43.78
1/29/2020	14:41	1/29/20 14:41	43.81
1/29/2020	15:49	1/29/20 15:49	43.89
1/29/2020	16:19	1/29/20 16:19	43.89
1/30/2020	8:54	1/30/20 8:54	44.02

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

Location/Well ID	**MW-77-046R**
Well Being Tested	**IRZ-17**
Screened Interval of Well Being Tested	**137 to 167 ft bgs**
Approximate Distance from Testing Well	**103 ft**

Date	Time	Date and Time	Depth to Water
1/27/2020	14:05	1/27/20 14:05	26.25
1/27/2020	16:27	1/27/20 16:27	26.21
1/28/2020	7:32	1/28/20 7:32	26.20
1/28/2020	8:37	1/28/20 8:37	26.19
1/28/2020	9:41	1/28/20 9:41	26.19
1/28/2020	10:45	1/28/20 10:45	26.18
1/28/2020	11:41	1/28/20 11:41	26.17
1/28/2020	12:36	1/28/20 12:36	26.14
1/28/2020	13:41	1/28/20 13:41	26.15
1/28/2020	14:36	1/28/20 14:36	26.15
1/28/2020	15:42	1/28/20 15:42	26.15
1/28/2020	16:17	1/28/20 16:17	26.14
1/29/2020	7:35	1/29/20 7:35	26.13
1/29/2020	8:35	1/29/20 8:35	26.07
1/29/2020	9:41	1/29/20 9:41	26.11
1/29/2020	10:36	1/29/20 10:36	26.03
1/29/2020	11:42	1/29/20 11:42	26.02
1/29/2020	12:37	1/29/20 12:37	26.02
1/29/2020	13:42	1/29/20 13:42	26.04
1/29/2020	14:37	1/29/20 14:37	26.02
1/29/2020	15:42	1/29/20 15:42	26.02
1/29/2020	16:16	1/29/20 16:16	26.12
1/30/2020	8:00	1/30/20 8:00	26.19

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

Location/Well ID	**MW-77-102**
Well Being Tested	**IRZ-17**
Screened Interval of Well Being Tested	**137 to 167 ft bgs**
Approximate Distance from Testing Well	**113 ft**

Date	Time	Date and Time	Depth to Water
1/27/2020	14:11	1/27/20 14:11	26.81
1/27/2020	16:24	1/27/20 16:24	26.80
1/28/2020	7:35	1/28/20 7:35	26.56
1/28/2020	8:33	1/28/20 8:33	26.54
1/28/2020	9:45	1/28/20 9:45	26.57
1/28/2020	10:31	1/28/20 10:31	26.55
1/28/2020	11:45	1/28/20 11:45	26.56
1/28/2020	12:32	1/28/20 12:32	26.52
1/28/2020	13:45	1/28/20 13:45	26.49
1/28/2020	14:32	1/28/20 14:32	26.42
1/28/2020	15:46	1/28/20 15:46	26.36
1/28/2020	16:14	1/28/20 16:14	26.46
1/29/2020	7:39	1/29/20 7:39	26.38
1/29/2020	8:31	1/29/20 8:31	26.40
1/29/2020	9:46	1/29/20 9:46	26.45
1/29/2020	10:32	1/29/20 10:32	26.50
1/29/2020	11:45	1/29/20 11:45	26.53
1/29/2020	12:31	1/29/20 12:31	26.58
1/29/2020	13:46	1/29/20 13:46	26.60
1/29/2020	14:31	1/29/20 14:31	26.69
1/29/2020	15:45	1/29/20 15:45	26.72
1/29/2020	16:12	1/29/20 16:12	26.74
1/30/2020	8:05	1/30/20 8:05	26.71

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

Location/Well ID	**MW-77-158**
Well Being Tested	**IRZ-17**
Screened Interval of Well Being Tested	**137 to 167 ft bgs**
Approximate Distance from Testing Well	**108 ft**

Date	Time	Date and Time	Depth to Water
1/27/2020	14:08	1/27/20 14:08	27.35
1/27/2020	16:25	1/27/20 16:25	27.34
1/28/2020	7:34	1/28/20 7:34	27.03
1/28/2020	8:34	1/28/20 8:34	26.80
1/28/2020	9:43	1/28/20 9:43	26.86
1/28/2020	10:32	1/28/20 10:32	26.60
1/28/2020	11:44	1/28/20 11:44	26.58
1/28/2020	12:33	1/28/20 12:33	26.23
1/28/2020	13:44	1/28/20 13:44	26.22
1/28/2020	14:33	1/28/20 14:33	25.88
1/28/2020	15:44	1/28/20 15:44	25.78
1/28/2020	16:15	1/28/20 16:15	26.85
1/29/2020	7:37	1/29/20 7:37	26.89
1/29/2020	8:32	1/29/20 8:32	26.91
1/29/2020	9:44	1/29/20 9:44	26.96
1/29/2020	10:33	1/29/20 10:33	27.00
1/29/2020	11:44	1/29/20 11:44	27.04
1/29/2020	12:32	1/29/20 12:32	27.11
1/29/2020	13:45	1/29/20 13:45	27.15
1/29/2020	14:33	1/29/20 14:33	27.41
1/29/2020	15:44	1/29/20 15:44	27.59
1/29/2020	16:14	1/29/20 16:14	27.38
1/30/2020	8:03	1/30/20 8:03	27.22

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

Location/Well ID	**MW-77-187**
Well Being Tested	**IRZ-17**
Screened Interval of Well Being Tested	**137 to 167 ft bgs**
Approximate Distance from Testing Well	**108 ft**

Date	Time	Date and Time	Depth to Water
1/27/2020	14:07	1/27/20 14:07	27.11
1/27/2020	16:26	1/27/20 16:26	27.08
1/28/2020	7:33	1/28/20 7:33	26.81
1/28/2020	8:36	1/28/20 8:36	26.65
1/28/2020	9:41	1/28/20 9:41	26.70
1/28/2020	10:43	1/28/20 10:43	26.53
1/28/2020	11:42	1/28/20 11:42	26.51
1/28/2020	12:34	1/28/20 12:34	26.27
1/28/2020	13:42	1/28/20 13:42	26.22
1/28/2020	14:35	1/28/20 14:35	25.98
1/28/2020	14:43	1/28/20 14:43	25.90
1/28/2020	16:16	1/28/20 16:16	26.54
1/29/2020	7:36	1/29/20 7:36	26.64
1/29/2020	8:33	1/29/20 8:33	26.66
1/29/2020	9:42	1/29/20 9:42	26.71
1/29/2020	10:34	1/29/20 10:34	26.76
1/29/2020	11:43	1/29/20 11:43	26.80
1/29/2020	12:35	1/29/20 12:35	26.86
1/29/2020	13:43	1/29/20 13:43	26.90
1/29/2020	14:34	1/29/20 14:34	27.23
1/29/2020	15:43	1/29/20 15:43	26.60
1/29/2020	16:15	1/29/20 16:15	27.20
1/30/2020	8:01	1/30/20 8:01	26.97

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

Location/Well ID	**MW-82-046**
Well Being Tested	**IRZ-17**
Screened Interval of Well Being Tested	**137 to 167 ft bgs**
Approximate Distance from Testing Well	**120 ft**

Date	Time	Date and Time	Depth to Water
1/27/2020	14:05	1/27/20 14:05	32.34
1/27/2020	16:28	1/27/20 16:28	32.35
1/28/2020	7:28	1/28/20 7:28	31.65
1/28/2020	8:37	1/28/20 8:37	31.61
1/28/2020	9:41	1/28/20 9:41	31.61
1/28/2020	10:35	1/28/20 10:35	31.61
1/28/2020	11:41	1/28/20 11:41	31.61
1/28/2020	12:33	1/28/20 12:33	31.61
1/28/2020	13:41	1/28/20 13:41	31.61
1/28/2020	14:35	1/28/20 14:35	31.61
1/28/2020	15:41	1/28/20 15:41	31.61
1/28/2020	16:13	1/28/20 16:13	31.61
1/29/2020	7:35	1/29/20 7:35	31.63
1/29/2020	8:35	1/29/20 8:35	31.62
1/29/2020	9:42	1/29/20 9:42	31.61
1/29/2020	10:38	1/29/20 10:38	31.61
1/29/2020	11:44	1/29/20 11:44	31.60
1/29/2020	12:36	1/29/20 12:36	31.61
1/29/2020	13:42	1/29/20 13:42	31.61
1/29/2020	14:37	1/29/20 14:37	31.61
1/29/2020	15:42	1/29/20 15:42	31.62
1/29/2020	16:16	1/29/20 16:16	31.62
1/30/2020	8:24	1/30/20 8:24	31.65

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

Location/Well ID	**MW-82-112**
Well Being Tested	**IRZ-17**
Screened Interval of Well Being Tested	**137 to 167 ft bgs**
Approximate Distance from Testing Well	**120 ft**

Date	Time	Date and Time	Depth to Water
1/27/2020	14:09	1/27/20 14:09	32.90
1/27/2020	16:29	1/27/20 16:29	32.81
1/28/2020	7:39	1/28/20 7:39	31.84
1/28/2020	8:36	1/28/20 8:36	31.81
1/28/2020	9:42	1/28/20 9:42	31.87
1/28/2020	10:34	1/28/20 10:34	31.87
1/28/2020	11:42	1/28/20 11:42	31.89
1/28/2020	12:33	1/28/20 12:33	31.84
1/28/2020	13:41	1/28/20 13:41	31.82
1/28/2020	14:34	1/28/20 14:34	31.74
1/28/2020	15:42	1/28/20 15:42	31.66
1/28/2020	16:14	1/28/20 16:14	31.73
1/29/2020	7:36	1/29/20 7:36	31.66
1/29/2020	8:34	1/29/20 8:34	31.66
1/29/2020	9:43	1/29/20 9:43	31.72
1/29/2020	10:38	1/29/20 10:38	31.76
1/29/2020	11:43	1/29/20 11:43	31.82
1/29/2020	12:35	1/29/20 12:35	31.89
1/29/2020	13:43	1/29/20 13:43	31.91
1/29/2020	14:36	1/29/20 14:36	31.98
1/29/2020	15:43	1/29/20 15:43	32.10
1/29/2020	16:15	1/29/20 16:15	32.07
1/30/2020	8:25	1/30/20 8:25	32.03

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

Location/Well ID	**MW-82-168**
Well Being Tested	**IRZ-17**
Screened Interval of Well Being Tested	**137 to 167 ft bgs**
Approximate Distance from Testing Well	**120 ft**

Date	Time	Date and Time	Depth to Water
1/27/2020	14:10	1/27/20 14:10	32.26
1/27/2020	16:26	1/27/20 16:26	32.78
1/28/2020	7:41	1/28/20 7:41	31.71
1/28/2020	8:35	1/28/20 8:35	31.52
1/28/2020	9:43	1/28/20 9:43	31.64
1/28/2020	10:33	1/28/20 10:33	31.42
1/28/2020	11:43	1/28/20 11:43	31.37
1/28/2020	12:32	1/28/20 12:32	31.10
1/28/2020	13:42	1/28/20 13:42	31.08
1/28/2020	14:33	1/28/20 14:33	30.80
1/28/2020	15:43	1/28/20 15:43	30.70
1/28/2020	16:11	1/28/20 16:11	31.46
1/29/2020	7:37	1/29/20 7:37	31.54
1/29/2020	8:33	1/29/20 8:33	31.56
1/29/2020	9:44	1/29/20 9:44	31.62
1/29/2020	10:33	1/29/20 10:33	31.66
1/29/2020	11:45	1/29/20 11:45	31.72
1/29/2020	12:34	1/29/20 12:34	31.78
1/29/2020	13:44	1/29/20 13:44	31.82
1/29/2020	14:35	1/29/20 14:35	32.11
1/29/2020	15:45	1/29/20 15:45	32.38
1/29/2020	16:13	1/29/20 16:13	32.08
1/30/2020	8:26	1/30/20 8:26	31.92

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

Location/Well ID	**MW-82-198**
Well Being Tested	**IRZ-17**
Screened Interval of Well Being Tested	**137 to 167 ft bgs**
Approximate Distance from Testing Well	**120 ft**

Date	Time	Date and Time	Depth to Water
1/27/2020	14:13	1/27/20 14:13	32.53
1/27/2020	16:25	1/27/20 16:25	32.51
1/28/2020	7:42	1/28/20 7:42	31.45
1/28/2020	8:34	1/28/20 8:34	31.32
1/28/2020	9:44	1/28/20 9:44	31.44
1/28/2020	10:32	1/28/20 10:32	31.29
1/28/2020	11:43	1/28/20 11:43	31.21
1/28/2020	12:31	1/28/20 12:31	30.99
1/28/2020	13:43	1/28/20 13:43	30.97
1/28/2020	14:33	1/28/20 14:33	30.73
1/28/2020	15:44	1/28/20 15:44	30.63
1/28/2020	16:12	1/28/20 16:12	31.17
1/29/2020	7:38	1/29/20 7:38	31.28
1/29/2020	8:32	1/29/20 8:32	31.32
1/29/2020	9:45	1/29/20 9:45	31.36
1/29/2020	10:31	1/29/20 10:31	31.40
1/29/2020	11:46	1/29/20 11:46	31.46
1/29/2020	12:33	1/29/20 12:33	31.51
1/29/2020	13:45	1/29/20 13:45	31.54
1/29/2020	14:34	1/29/20 14:34	31.93
1/29/2020	15:46	1/29/20 15:46	32.21
1/29/2020	16:12	1/29/20 16:12	31.86
1/30/2020	8:27	1/30/20 8:27	31.64

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

MW-31-060 During IRZ-17 Lower Screen (137 to 167 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-17: ~136 Feet
Legend
Transducer
Manual
Depth to Water (feet)
41.7
41.9
42.1
42.3
42.5
42.7
42.9
43.1
43.3
1/28/20 6:00
1/28/20 9:00
1/28/20 12:00
1/28/20 15:00
1/28/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 910.2 gal
Avg. Flow Rate: 7.95 gpm
Change in Water Level in IRZ-17: 2.63 ft
Specific Capacity: 3.02 gpm/ft
Step 2:
Total Volume Pumped: 1816.8 gal
Avg. Flow Rate: 15.11 gpm
Change in Water Level in IRZ-17: 5.66 ft
Specific Capacity: 2.67 gpm/ft
Step 3:
Total Volume Pumped: 2706.8 gal
Avg. Flow Rate: 22.55 gpm
Change in Water Level in IRZ-17: 9.02 ft
Specific Capacity: 2.50 gpm/ft
Step 4:
Total Volume Pumped: 3624.0 gal
Avg. Flow Rate: 30.19 gpm
Change in Water Level in IRZ-17: 12.75 ft
Specific Capacity: 2.37 gpm/ft

MW-31-135 During IRZ-17 Lower Screen (137 to 167 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-17: ~173 Feet
Legend
Transducer
Manual
Depth to Water (feet)
43.2
43.4
43.6
43.8
44.0
44.2
44.4
44.6
1/28/20 6:00
1/28/20 9:00
1/28/20 12:00
1/28/20 15:00
1/28/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 910.2 gal
Avg. Flow Rate: 7.95 gpm
Change in Water Level in IRZ-17: 2.63 ft
Specific Capacity: 3.02 gpm/ft
Step 2:
Total Volume Pumped: 1816.8 gal
Avg. Flow Rate: 15.11 gpm
Change in Water Level in IRZ-17: 5.66 ft
Specific Capacity: 2.67 gpm/ft
Step 3:
Total Volume Pumped: 2706.8 gal
Avg. Flow Rate: 22.55 gpm
Change in Water Level in IRZ-17: 9.02 ft
Specific Capacity: 2.50 gpm/ft
Step 4:
Total Volume Pumped: 3624.0 gal
Avg. Flow Rate: 30.19 gpm
Change in Water Level in IRZ-17: 12.75 ft
Specific Capacity: 2.37 gpm/ft

MW-77-046R During IRZ-17 Lower Screen (137 to 167 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-17: ~103 Feet
Legend
Transducer
Manual
Depth to Water (feet)
25.6
25.8
26.0
26.2
26.4
26.6
26.8
27.0
Step 1:
Total Volume Pumped: 910.2 gal
Avg. Flow Rate: 7.95 gpm
Change in Water Level in IRZ-17: 2.63 ft
Specific Capacity: 3.02 gpm/ft
Step 2:
Total Volume Pumped: 1816.8 gal
Avg. Flow Rate: 15.11 gpm
Change in Water Level in IRZ-17: 5.66 ft
Specific Capacity: 2.67 gpm/ft
Step 3:
Total Volume Pumped: 2706.8 gal
Avg. Flow Rate: 22.55 gpm
Change in Water Level in IRZ-17: 9.02 ft
Specific Capacity: 2.50 gpm/ft
Step 4:
Total Volume Pumped: 3624.0 gal
Avg. Flow Rate: 30.19 gpm
Change in Water Level in IRZ-17: 12.75 ft
Specific Capacity: 2.37 gpm/ft
1/28/20 6:00
1/28/20 9:00
1/28/20 12:00
1/28/20 15:00
1/28/20 18:00
Date and Time

MW-77-102 During IRZ-17 Lower Screen (137 to 167 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Transducer was not used
Distance to IRZ-17: ~113 Feet
Legend
Manual
Depth to Water (feet)
26.1
26.2
26.3
26.4
26.5
26.6
26.7
26.8
26.9
Step 1:
Total Volume Pumped: 910.2 gal
Avg. Flow Rate: 7.95 gpm
Change in Water Level in IRZ-17: 2.63 ft
Specific Capacity: 3.02 gpm/ft
Step 2:
Total Volume Pumped: 1816.8 gal
Avg. Flow Rate: 15.11 gpm
Change in Water Level in IRZ-17: 5.66 ft
Specific Capacity: 2.67 gpm/ft
Step 3:
Total Volume Pumped: 2706.8 gal
Avg. Flow Rate: 22.55 gpm
Change in Water Level in IRZ-17: 9.02 ft
Specific Capacity: 2.50 gpm/ft
Step 4:
Total Volume Pumped: 3624.0 gal
Avg. Flow Rate: 30.19 gpm
Change in Water Level in IRZ-17: 12.75 ft
Specific Capacity: 2.37 gpm/ft
1/28/20 6:00
1/28/20 9:00
1/28/20 12:00
1/28/20 15:00
1/28/20 18:00
Date and Time

MW-77-158 During IRZ-17 Lower Screen (137 to 167 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-17: ~108 Feet
Legend
Transducer
Manual
Depth to Water (feet)
24.5
25.0
25.5
26.0
26.5
27.0
27.5
28.0
28.5
1/28/20 6:00
1/28/20 9:00
1/28/20 12:00
1/28/20 15:00
1/28/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 910.2 gal
Avg. Flow Rate: 7.95 gpm
Change in Water Level in IRZ-17: 2.63 ft
Specific Capacity: 3.02 gpm/ft
Step 2:
Total Volume Pumped: 1816.8 gal
Avg. Flow Rate: 15.11 gpm
Change in Water Level in IRZ-17: 5.66 ft
Specific Capacity: 2.67 gpm/ft
Step 3:
Total Volume Pumped: 2706.8 gal
Avg. Flow Rate: 22.55 gpm
Change in Water Level in IRZ-17: 9.02 ft
Specific Capacity: 2.50 gpm/ft
Step 4:
Total Volume Pumped: 3624.0 gal
Avg. Flow Rate: 30.19 gpm
Change in Water Level in IRZ-17: 12.75 ft
Specific Capacity: 2.37 gpm/ft

MW-77-187 During IRZ-17 Lower Screen (137 to 167 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Transducer was not used
Distance to IRZ-17: ~108 Feet
Legend
Manual
Depth to Water (feet)
24.5
25.0
25.5
26.0
26.5
27.0
27.5
28.0
28.5
Step 1:
Total Volume Pumped: 910.2 gal
Avg. Flow Rate: 7.95 gpm
Change in Water Level in IRZ-17: 2.63 ft
Specific Capacity: 3.02 gpm/ft
Step 2:
Total Volume Pumped: 1816.8 gal
Avg. Flow Rate: 15.11 gpm
Change in Water Level in IRZ-17: 5.66 ft
Specific Capacity: 2.67 gpm/ft
Step 3:
Total Volume Pumped: 2706.8 gal
Avg. Flow Rate: 22.55 gpm
Change in Water Level in IRZ-17: 9.02 ft
Specific Capacity: 2.50 gpm/ft
Step 4:
Total Volume Pumped: 3624.0 gal
Avg. Flow Rate: 30.19 gpm
Change in Water Level in IRZ-17: 12.75 ft
Specific Capacity: 2.37 gpm/ft
1/28/20 6:00
1/28/20 9:00
1/28/20 12:00
1/28/20 15:00
1/28/20 18:00
Date and Time

MW-82-046 During IRZ-17 Lower Screen (137 to 167 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-17: ~120 Feet
Legend
Transducer
Manual
Possible transducer data drift.
Depth to Water (feet)
30.9
31.1
31.3
31.5
31.7
31.9
32.1
32.3
1/28/20 6:00
1/28/20 9:00
1/28/20 12:00
1/28/20 15:00
1/28/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 910.2 gal
Avg. Flow Rate: 7.95 gpm
Change in Water Level in IRZ-17: 2.63 ft
Specific Capacity: 3.02 gpm/ft
Step 2:
Total Volume Pumped: 1816.8 gal
Avg. Flow Rate: 15.11 gpm
Change in Water Level in IRZ-17: 5.66 ft
Specific Capacity: 2.67 gpm/ft
Step 3:
Total Volume Pumped: 2706.8 gal
Avg. Flow Rate: 22.55 gpm
Change in Water Level in IRZ-17: 9.02 ft
Specific Capacity: 2.50 gpm/ft
Step 4:
Total Volume Pumped: 3624.0 gal
Avg. Flow Rate: 30.19 gpm
Change in Water Level in IRZ-17: 12.75 ft
Specific Capacity: 2.37 gpm/ft

MW-82-112 During IRZ-17 Lower Screen (137 to 167 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Transducer was not used
Distance to IRZ-17: ~120 Feet
Legend
Manual
Depth to Water (feet)
31.4
31.5
31.6
31.7
31.8
31.9
32.0
32.1
32.2
Step 1:
Total Volume Pumped: 910.2 gal
Avg. Flow Rate: 7.95 gpm
Change in Water Level in IRZ-17: 2.63 ft
Specific Capacity: 3.02 gpm/ft
Step 2:
Total Volume Pumped: 1816.8 gal
Avg. Flow Rate: 15.11 gpm
Change in Water Level in IRZ-17: 5.66 ft
Specific Capacity: 2.67 gpm/ft
Step 3:
Total Volume Pumped: 2706.8 gal
Avg. Flow Rate: 22.55 gpm
Change in Water Level in IRZ-17: 9.02 ft
Specific Capacity: 2.50 gpm/ft
Step 4:
Total Volume Pumped: 3624.0 gal
Avg. Flow Rate: 30.19 gpm
Change in Water Level in IRZ-17: 12.75 ft
Specific Capacity: 2.37 gpm/ft
1/28/20 6:00
1/28/20 9:00
1/28/20 12:00
1/28/20 15:00
1/28/20 18:00
Date and Time

MW-82-168 During IRZ-17 Lower Screen (137 to 167 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-17: ~120 Feet
Legend
Transducer
Manual
Depth to Water (feet)
30.0
30.5
31.0
31.5
32.0
32.5
33.0
1/28/20 6:00
1/28/20 9:00
1/28/20 12:00
1/28/20 15:00
1/28/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 910.2 gal
Avg. Flow Rate: 7.95 gpm
Change in Water Level in IRZ-17: 2.63 ft
Specific Capacity: 3.02 gpm/ft
Step 2:
Total Volume Pumped: 1816.8 gal
Avg. Flow Rate: 15.11 gpm
Change in Water Level in IRZ-17: 5.66 ft
Specific Capacity: 2.67 gpm/ft
Step 3:
Total Volume Pumped: 2706.8 gal
Avg. Flow Rate: 22.55 gpm
Change in Water Level in IRZ-17: 9.02 ft
Specific Capacity: 2.50 gpm/ft
Step 4:
Total Volume Pumped: 3624.0 gal
Avg. Flow Rate: 30.19 gpm
Change in Water Level in IRZ-17: 12.75 ft
Specific Capacity: 2.37 gpm/ft

MW-82-198 During IRZ-17 Lower Screen (137 to 167 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Transducer was not used
Distance to IRZ-17: ~120 Feet
Legend
Manual
Depth to Water (feet)
30.0
30.5
31.0
31.5
32.0
32.5
Step 1:
Total Volume Pumped: 910.2 gal
Avg. Flow Rate: 7.95 gpm
Change in Water Level in IRZ-17: 2.63 ft
Specific Capacity: 3.02 gpm/ft
Step 2:
Total Volume Pumped: 1816.8 gal
Avg. Flow Rate: 15.11 gpm
Change in Water Level in IRZ-17: 5.66 ft
Specific Capacity: 2.67 gpm/ft
Step 3:
Total Volume Pumped: 2706.8 gal
Avg. Flow Rate: 22.55 gpm
Change in Water Level in IRZ-17: 9.02 ft
Specific Capacity: 2.50 gpm/ft
Step 4:
Total Volume Pumped: 3624.0 gal
Avg. Flow Rate: 30.19 gpm
Change in Water Level in IRZ-17: 12.75 ft
Specific Capacity: 2.37 gpm/ft
1/28/20 6:00
1/28/20 9:00
1/28/20 12:00
1/28/20 15:00
1/28/20 18:00
Date and Time

Specific Capacity Testing

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	**IRZ-17**
Date	**1/25/2020**
Screened Interval Tested	**Lower (137 to 167 ft bgs)**
Packer Set Depth	**91 to 95 ft btoc**
Packer Seal Test	Confirmed packer to be watertight before test
Tests Conducted	Four-step specific capacity test (8.1, 15.1, 22.6, 30.1)
Purpose	Well performance test
Summary	Specific capacity: 1.47 to 1.77 gpm/ft
Notes	Inconsistent pumping rate at start of Step 1
	Flow meter malfunctioned during Step 3
Oversight Signature	
Date	2/24/2020

Acronyms & Abbreviations
bgs = below ground surface
btoc = below top of casing
ft = feet
gpm = gallons per minute

Specific Capacity Test

Location/Well ID	IRZ-17 (Lower)
Date	1/25/2020
Screened Interval	137 to 167 ft bgs
Pump Depth (ft btoc)	165.00
Packer Depth (ft btoc)	91.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 137 to 167 ft btoc	27.87
Initial Water Level Within 36 to 57 ft btoc	27.85
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	9062.18
Approx Pumped Volume (gal)	9062.18
Calculated Volume Purged (gal)	9056.75
Difference in Volume Pumped vs. Calculated	5.43
Number of Specific Capacity Steps	4
Pumping Rates (in order)	8.1, 15.1, 22.6, 30.1 gpm

Step 1 - Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time (min)	Pumping Rate (gpm)	Total Volume pumped (gal)	Depth to Water (ft)	Drawdown (ft)
8:00:00	0	0	29.89	0.00	27.87	0.00
8:00:20	0.3	0.33	2.28	0.76	28.70	0.83
8:00:40	0.3	0.67	6.35	2.88	31.75	3.88
8:01:00	0.3	1.00	7.74	5.46	32.21	4.34
8:02:00	1.0	2.00	7.91	13.37	32.41	4.54
8:03:00	1.0	3.00	7.60	20.97	32.29	4.42
8:04:00	1.0	4.00	7.48	28.45	32.22	4.35
8:05:00	1.0	5.00	7.76	36.21	32.38	4.51
8:06:00	1.0	6.00	7.64	43.85	32.34	4.47
8:07:00	1.0	7.00	7.60	51.45	32.33	4.46
8:08:00	1.0	8.00	7.54	58.99	32.32	4.45
8:09:00	1.0	9.00	7.46	66.45	32.30	4.43
8:10:00	1.0	10.00	7.46	73.91	32.31	4.44
8:12:00	2.0	12.00	7.74	89.39	32.43	4.56
8:14:00	2.0	14.00	7.60	104.59	32.37	4.50
8:16:00	2.0	16.00	7.60	119.79	32.38	4.51
8:18:00	2.0	18.00	7.62	135.03	32.39	4.52
8:20:00	2.0	20.00	7.62	150.27	32.39	4.52
8:22:00	2.0	22.00	7.60	165.47	32.40	4.53
8:24:00	2.0	24.00	7.60	180.67	32.40	4.53
8:26:00	2.0	26.00	7.60	195.87	32.41	4.54
8:28:00	2.0	28.00	7.62	211.11	32.40	4.53
8:30:00	2.0	30.00	7.64	226.39	32.39	4.52
8:35:00	5.0	35.00	7.60	264.39	32.38	4.51
8:40:00	5.0	40.00	7.60	302.39	32.40	4.53
8:45:00	5.0	45.00	7.60	340.39	32.39	4.52
8:50:00	5.0	50.00	7.62	378.49	32.40	4.53
8:55:00	5.0	55.00	7.60	416.49	32.40	4.53
9:00:00	5.0	60.00	7.60	454.49	32.40	4.53
9:10:00	10.0	70.00	7.60	530.49	32.41	4.54
9:20:00	10.0	80.00	7.60	606.49	32.40	4.53
9:30:00	10.0	90.00	7.62	682.69	32.40	4.53
9:40:00	10.0	100.00	7.60	758.69	32.40	4.53
9:50:00	10.0	110.00	7.60	834.69	32.40	4.53
10:00:00	10.0	120.00	7.60	910.69	32.41	4.54

Total Volume Pumped for Step 1 (gal)	910.69
Average Pumping Rate (gpm)	8.06
Specific Capacity (gpm/ft)	1.78

Specific Capacity Test

Location/Well ID	IRZ-17 (Lower)
Date	1/25/2020
Screened Interval	137 to 167 ft bgs
Pump Depth (ft btoc)	165.00
Packer Depth (ft btoc)	91.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 137 to 167 ft btoc	27.87
Initial Water Level Within 36 to 57 ft btoc	27.85
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	9062.18
Approx Pumped Volume (gal)	9062.18
Calculated Volume Purged (gal)	9056.75
Difference in Volume Pumped vs. Calculated	5.43
Number of Specific Capacity Steps	4
Pumping Rates (in order)	8.1, 15.1, 22.6, 30.1 gpm

Step 2 - Time (HR:MN:SEC)	Change in Time Between measurements (min)	Elapsed Time from Test Start (min)	Pumping Rate (gpm)	Total Volume Pumped (gal)	Depth to Water (ft)	Drawdown (ft)	Elapsed Time from Step 2 Start (min)
10:00:20	0.3	120.33	12.14	914.73	35.15	7.28	0.33
10:00:40	0.3	120.67	15.14	919.78	36.98	9.11	0.67
10:01:00	0.3	121.00	15.23	924.86	37.18	9.31	1.00
10:02:00	1.0	122.00	15.23	940.09	37.22	9.35	2.00
10:03:00	1.0	123.00	15.30	955.39	37.23	9.36	3.00
10:04:00	1.0	124.00	15.25	970.64	37.22	9.35	4.00
10:05:00	1.0	125.00	15.23	985.87	37.23	9.36	5.00
10:06:00	1.0	126.00	15.23	1001.10	37.24	9.37	6.00
10:07:00	1.0	127.00	15.23	1016.33	37.25	9.38	7.00
10:08:00	1.0	128.00	15.21	1031.54	37.25	9.38	8.00
10:09:00	1.0	129.00	15.23	1046.77	37.26	9.39	9.00
10:10:00	1.0	130.00	15.25	1062.02	37.27	9.40	10.00
10:12:00	2.0	132.00	15.25	1092.52	37.28	9.41	12.00
10:14:00	2.0	134.00	15.23	1122.98	37.31	9.44	14.00
10:16:00	2.0	136.00	15.23	1153.44	37.31	9.44	16.00
10:18:00	2.0	138.00	15.23	1183.90	37.32	9.45	18.00
10:20:00	2.0	140.00	15.23	1214.36	37.32	9.45	20.00
10:22:00	2.0	142.00	15.21	1244.78	37.32	9.45	22.00
10:24:00	2.0	144.00	15.23	1275.24	37.32	9.45	24.00
10:26:00	2.0	146.00	15.23	1305.70	37.33	9.46	26.00
10:28:00	2.0	148.00	15.23	1336.16	37.33	9.46	28.00
10:30:00	2.0	150.00	15.23	1366.62	37.34	9.47	30.00
10:35:00	5.0	155.00	15.23	1442.77	37.35	9.48	35.00
10:40:00	5.0	160.00	15.21	1518.82	37.35	9.48	40.00
10:45:00	5.0	165.00	15.21	1594.87	37.37	9.50	45.00
10:50:00	5.0	170.00	15.25	1671.12	37.40	9.53	50.00
10:55:00	5.0	175.00	15.21	1747.17	37.40	9.53	55.00
11:00:00	5.0	180.00	15.23	1823.32	37.40	9.53	60.00
11:10:00	10.0	190.00	15.21	1975.42	37.40	9.53	70.00
11:20:00	10.0	200.00	15.23	2127.72	37.40	9.53	80.00
11:30:00	10.0	210.00	15.21	2279.82	37.40	9.53	90.00
11:40:00	10.0	220.00	15.21	2431.92	37.41	9.54	100.00
11:50:00	10.0	230.00	15.21	2584.02	37.42	9.55	110.00
12:00:00	10.0	240.00	15.21	2736.12	37.42	9.55	120.00

Total Volume Pumped for Step 2 (gal)	1825.43
Average Pumping Rate (gpm)	15.14
Specific Capacity (gpm/ft)	1.58

Specific Capacity Test

Location/Well ID	IRZ-17 (Lower)
Date	1/25/2020
Screened Interval	137 to 167 ft bgs
Pump Depth (ft btoc)	165.00
Packer Depth (ft btoc)	91.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 137 to 167 ft btoc	27.87
Initial Water Level Within 36 to 57 ft btoc	27.85
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	9062.18
Approx Pumped Volume (gal)	9062.18
Calculated Volume Purged (gal)	9056.75
Difference in Volume Pumped vs. Calculated	5.43
Number of Specific Capacity Steps	4
Pumping Rates (in order)	8.1, 15.1, 22.6, 30.1 gpm

Step 3 - Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time from Test Start (min)	Pumping Rate (gpm)	Total Volume Pumped (Gallons)	Depth to Water (ft)	Drawdown (ft)	Elapsed Time from Step 3 Start (min)
12:00:20	0.3	240.33	24.92	2744.42	41.50	13.63	0.33
12:00:40	0.3	240.67	22.49	2751.92	42.20	14.33	0.67
12:01:00	0.3	241.00	22.53	2759.43	42.25	14.38	1.00
12:02:00	1.0	242.00	22.64	2782.07	42.29	14.42	2.00
12:03:00	1.0	243.00	22.62	2804.69	42.40	14.53	3.00
12:04:00	1.0	244.00	22.60	2827.29	42.41	14.54	4.00
12:05:00	1.0	245.00	22.58	2849.87	42.41	14.54	5.00
12:06:00	1.0	246.00	22.60	2872.47	42.42	14.55	6.00
12:07:00	1.0	247.00	22.60	2895.07	42.42	14.55	7.00
12:08:00	1.0	248.00	22.60	2917.67	42.42	14.55	8.00
12:09:00	1.0	249.00	22.58	2940.25	42.43	14.56	9.00
12:10:00	1.0	250.00	22.58	2962.83	42.46	14.59	10.00
12:12:00	2.0	252.00	22.60	3008.03	42.49	14.62	12.00
12:14:00	2.0	254.00	22.60	3053.23	42.50	14.63	14.00
12:16:00	2.0	256.00	22.60	3098.43	42.49	14.62	16.00
12:18:00	2.0	258.00	22.60	3143.63	42.50	14.63	18.00
12:20:00	2.0	260.00	22.58	3188.79	42.50	14.63	20.00
12:22:00	2.0	262.00	22.60	3233.99	42.50	14.63	22.00
12:24:00	2.0	264.00	22.56	3279.11	42.51	14.64	24.00
12:26:00	2.0	266.00	22.56	3324.23	42.51	14.64	26.00
12:28:00	2.0	268.00	22.58	3369.39	42.50	14.63	28.00
12:30:00	2.0	270.00	22.58	3414.55	42.50	14.63	30.00
12:35:00	5.0	275.00	22.58	3527.45	42.51	14.64	35.00
12:40:00	5.0	280.00	22.56	3640.25	42.52	14.65	40.00
12:45:00	5.0	285.00	22.58	3753.15	42.53	14.66	45.00
12:50:00	5.0	290.00	22.58	3866.05	42.53	14.66	50.00
12:55:00	5.0	295.00	22.56	3978.85	42.54	14.67	55.00
13:00:00	5.0	300.00	22.56	4091.65	42.56	14.69	60.00
13:10:00	10.0	310.00	22.56	4317.25	42.57	14.70	70.00
13:20:00	10.0	320.00	22.56	4542.85	42.58	14.71	80.00
13:30:00	10.0	330.00	22.58	4768.65	42.59	14.72	90.00
13:40:00	10.0	340.00	22.56	4994.25	42.61	14.74	100.00
13:50:00	10.0	350.00	22.58	5220.05	42.62	14.75	110.00
14:00:00	10.0	360.00	22.58	5445.85	42.64	14.77	120.00

Total Volume Pumped for Step 3 (gal)	2709.73
Average Pumping Rate (gpm)	22.65
Specific Capacity (gpm/ft)	1.53

Specific Capacity Test

Location/Well ID	IRZ-17 (Lower)
Date	1/25/2020
Screened Interval	137 to 167 ft bgs
Pump Depth (ft btoc)	165.00
Packer Depth (ft btoc)	91.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 137 to 167 ft btoc	27.87
Initial Water Level Within 36 to 57 ft btoc	27.85
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	9062.18
Approx Pumped Volume (gal)	9062.18
Calculated Volume Purged (gal)	9056.75
Difference in Volume Pumped vs. Calculated	5.43
Number of Specific Capacity Steps	4
Pumping Rates (in order)	8.1, 15.1, 22.6, 30.1 gpm

Step 4 - Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time from Test Start (min)	Pumping Rate (gpm)	Total Volume Pumped (Gallons)	Depth to Water (ft)	Drawdown (ft)	Elapsed Time from Step 4 Start (min)
14:00:20	0.3	360.33	28.63	5455.39	47.05	19.18	0.33
14:00:40	0.3	360.67	29.92	5465.37	47.71	19.84	0.33
14:01:00	0.3	361.00	30.20	5475.43	47.85	19.98	0.67
14:02:00	1.0	362.00	30.18	5505.61	47.94	20.07	1.67
14:03:00	1.0	363.00	30.18	5535.79	47.96	20.09	2.67
14:04:00	1.0	364.00	30.20	5565.99	47.98	20.11	3.67
14:05:00	1.0	365.00	30.18	5596.17	48.01	20.14	4.67
14:06:00	1.0	366.00	30.16	5626.33	48.01	20.14	5.67
14:07:00	1.0	367.00	30.16	5656.49	48.02	20.15	6.67
14:08:00	1.0	368.00	30.16	5686.65	48.03	20.16	7.67
14:09:00	1.0	369.00	30.16	5716.81	48.05	20.18	8.67
14:10:00	1.0	370.00	30.18	5746.99	48.06	20.19	9.67
14:12:00	2.0	372.00	30.16	5807.31	48.07	20.20	11.67
14:14:00	2.0	374.00	29.72	5866.75	48.08	20.21	13.67
14:16:00	2.0	376.00	30.11	5926.97	48.43	20.56	15.67
14:18:00	2.0	378.00	30.09	5987.15	48.47	20.60	17.67
14:20:00	2.0	380.00	30.09	6047.33	48.48	20.61	19.67
14:22:00	2.0	382.00	30.09	6107.51	48.51	20.64	21.67
14:24:00	2.0	384.00	30.14	6167.79	48.52	20.65	23.67
14:26:00	2.0	386.00	30.11	6228.01	48.52	20.65	25.67
14:28:00	2.0	388.00	30.11	6288.23	48.52	20.65	27.67
14:30:00	2.0	390.00	30.66	6349.55	48.52	20.65	29.67
14:35:00	5.0	395.00	30.09	6500.00	48.13	20.26	34.67
14:40:00	5.0	400.00	30.07	6650.35	48.15	20.28	39.67
14:45:00	5.0	405.00	30.09	6800.80	48.17	20.30	44.67
14:50:00	5.0	410.00	30.07	6951.15	48.18	20.31	49.67
14:55:00	5.0	415.00	30.09	7101.60	48.18	20.31	54.67
15:00:00	5.0	420.00	30.09	7252.05	48.20	20.33	59.67
15:10:00	10.0	430.00	30.09	7552.95	48.23	20.36	69.67
15:20:00	10.0	440.00	30.04	7853.35	48.24	20.37	79.67
15:30:00	10.0	450.00	30.07	8154.05	48.25	20.38	89.67
15:40:00	10.0	460.00	30.07	8454.75	48.28	20.41	99.67
15:50:00	10.0	470.00	30.09	8755.65	48.29	20.42	109.67
16:00:00	10.0	480.00	30.11	9056.75	48.32	20.45	119.67
16:01:00	1.0	481.00	0.00	9056.75	28.45	0.58	120.67
16:02:00	1.0	482.00	0.00	9056.75	27.90	0.03	121.67
16:03:00	1.0	483.00	0.00	9056.75	28.25	0.38	122.67
16:04:00	1.0	484.00	0.00	9056.75	28.25	0.38	123.67
16:05:00	1.0	485.00	0.00	9056.75	28.25	0.38	124.67
16:06:00	1.0	486.00	0.00	9056.75	28.23	0.36	125.67
16:07:00	1.0	487.00	0.00	9056.75	28.20	0.33	126.67
16:08:00	1.0	488.00	0.00	9056.75	28.20	0.33	127.67
16:09:00	1.0	489.00	0.00	9056.75	28.15	0.28	128.67
16:10:00	1.0	490.00	0.00	9056.75	28.13	0.26	129.67
Total Volume Pumped for Step 4 (gal)			**3610.90**				
Average Pumping Rate (gpm)			**30.08**				
Specific Capacity (gpm/ft)			**1.47**				

Acronyms & Abbreviations
bgs = below ground surface
btoc = below top of casing
ft = feet
gal = gallons
gpm = gallons per minute
min = minutes

IRZ-17 Lower Screen (137 to 167 ft) Linear Drawdown Plot
Step 1:
Total Volume Pumped: 910.69 gal
Avg. Flow Rate: 8.06 gpm
Drawdown: 4.54 ft
Specific Capacity: 1.78 gpm/ft
Step 2:
Total Volume Pumped: 1825.43 gal
Avg. Flow Rate: 15.14 gpm
Drawdown: 9.55 ft
Specific Capacity: 1.58 gpm/ft
Step 3:
Total Volume Pumped: 2709.73 gal
Avg. Flow Rate: 22.65 gpm
Drawdown: 14.77 ft
Specific Capacity: 1.53 gpm/ft
Step 4:
Total Volume Pumped: 3610.90 gal
Avg. Flow Rate: 30.08 gpm
Drawdown: 20.45 ft
Specific Capacity: 1.47 gpm/ft
Recovery
Inconsistent Pumping Rate
Flow meter malfunctioned
Drawdown (feet)
0
5
10
15
20
25
Elapsed Time (min)
0
100
200
300
400
500
600
700

IRZ-17 Lower Screen (137 to 167 ft) Semi-Log Drawdown Plot

Specific Capacity/
Injection Test Monitoring Point

Location/Well ID	MW-31-060
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	137 to 167 ft bgs
Approximate Distance from Testing Well	136 ft

Date	Time	Date and Time	Depth to Water
1/24/2020	16:27	1/24/20 16:27	42.64
1/25/2020	7:34	1/25/20 7:34	42.64
1/25/2020	8:37	1/25/20 8:37	42.66
1/25/2020	9:48	1/25/20 9:48	42.63
1/25/2020	10:36	1/25/20 10:36	42.65
1/25/2020	11:48	1/25/20 11:48	42.62
1/25/2020	12:37	1/25/20 12:37	42.63
1/25/2020	13:48	1/25/20 13:48	42.64
1/25/2020	14:37	1/25/20 14:37	42.65
1/25/2020	15:39	1/25/20 15:39	42.68
1/25/2020	16:20	1/25/20 16:20	42.67
1/26/2020	7:19	1/26/20 7:19	42.59
1/26/2020	8:38	1/26/20 8:38	42.62
1/26/2020	9:49	1/26/20 9:49	42.64
1/26/2020	10:38	1/26/20 10:38	42.68
1/26/2020	11:52	1/26/20 11:52	42.68
1/26/2020	12:38	1/26/20 12:38	42.71
1/26/2020	13:46	1/26/20 13:46	42.75
1/26/2020	14:39	1/26/20 14:39	42.80
1/26/2020	15:41	1/26/20 15:41	42.83
1/26/2020	16:21	1/26/20 16:21	42.74
1/27/2020	8:31	1/27/20 8:31	42.97

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

Location/Well ID	MW-31-135
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	137 to 167 ft bgs
Approximate Distance from Testing Well	173 ft

Date	Time	Date and Time	Depth to Water
1/24/2020	16:20	1/24/20 16:20	44.08
1/25/2020	7:32	1/25/20 7:32	44.05
1/25/2020	8:39	1/25/20 8:39	44.09
1/25/2020	9:47	1/25/20 9:47	44.09
1/25/2020	10:37	1/25/20 10:37	44.13
1/25/2020	11:46	1/25/20 11:46	44.13
1/25/2020	12:38	1/25/20 12:38	44.16
1/25/2020	13:47	1/25/20 13:47	44.16
1/25/2020	14:38	1/25/20 14:38	44.21
1/25/2020	15:38	1/25/20 15:38	44.23
1/25/2020	16:21	1/25/20 16:21	44.12
1/26/2020	7:21	1/26/20 7:21	44.01
1/26/2020	8:37	1/26/20 8:37	44.04
1/26/2020	9:50	1/26/20 9:50	44.06
1/26/2020	10:37	1/26/20 10:37	44.08
1/26/2020	11:52	1/26/20 11:52	44.08
1/26/2020	12:37	1/26/20 12:37	44.10
1/26/2020	13:48	1/26/20 13:48	44.10
1/26/2020	14:37	1/26/20 14:37	44.12
1/26/2020	15:42	1/26/20 15:42	44.12
1/26/2020	16:19	1/26/20 16:19	44.08
1/27/2020	8:33	1/27/20 8:33	43.92

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	MW-77-046R
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	137 to 167 ft bgs
Approximate Distance from Testing Well	103 ft

Date	Time	Date and Time	Depth to Water
1/24/2020	15:46	1/24/20 15:46	26.35
1/25/2020	7:31	1/25/20 7:31	26.33
1/25/2020	8:32	1/25/20 8:32	26.30
1/25/2020	9:40	1/25/20 9:40	26.27
1/25/2020	10:28	1/25/20 10:28	26.27
1/25/2020	11:37	1/25/20 11:37	26.26
1/25/2020	12:32	1/25/20 12:32	26.27
1/25/2020	13:36	1/25/20 13:36	26.27
1/25/2020	14:32	1/25/20 14:32	26.31
1/25/2020	15:30	1/25/20 15:30	26.31
1/25/2020	16:15	1/25/20 16:15	26.31
1/26/2020	7:16	1/26/20 7:16	26.26
1/26/2020	8:35	1/26/20 8:35	26.26
1/26/2020	9:31	1/26/20 9:31	26.27
1/26/2020	10:34	1/26/20 10:34	26.29
1/26/2020	11:21	1/26/20 11:21	26.31
1/26/2020	12:36	1/26/20 12:36	26.34
1/26/2020	13:32	1/26/20 13:32	26.36
1/26/2020	14:35	1/26/20 14:35	26.42
1/26/2020	15:30	1/26/20 15:30	26.47
1/26/2020	16:20	1/26/20 16:20	26.40
1/27/2020	8:10	1/27/20 8:10	26.19

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	MW-77-102
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	137 to 167 ft bgs
Approximate Distance from Testing Well	113 ft

Date	Time	Date and Time	Depth to Water
1/24/2020	15:52	1/24/20 15:52	27.00
1/25/2020	7:27	1/25/20 7:27	26.85
1/25/2020	8:36	1/25/20 8:36	26.84
1/25/2020	9:36	1/25/20 9:36	26.86
1/25/2020	10:33	1/25/20 10:33	26.89
1/25/2020	11:33	1/25/20 11:33	26.94
1/25/2020	12:36	1/25/20 12:36	27.00
1/25/2020	13:31	1/25/20 13:31	27.02
1/25/2020	14:37	1/25/20 14:37	27.05
1/25/2020	15:25	1/25/20 15:25	27.04
1/25/2020	16:19	1/25/20 16:19	27.00
1/26/2020	7:20	1/26/20 7:20	26.73
1/26/2020	8:32	1/26/20 8:32	26.80
1/26/2020	9:35	1/26/20 9:35	26.83
1/26/2020	10:31	1/26/20 10:31	26.90
1/26/2020	11:24	1/26/20 11:24	26.90
1/26/2020	12:31	1/26/20 12:31	26.93
1/26/2020	13:35	1/26/20 13:35	26.94
1/26/2020	14:32	1/26/20 14:32	26.97
1/26/2020	15:33	1/26/20 15:33	26.98
1/26/2020	16:17	1/26/20 16:17	26.95
1/27/2020	8:14	1/27/20 8:14	26.62

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

Location/Well ID	MW-77-158
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	137 to 167 ft bgs
Approximate Distance from Testing Well	108 ft

Date	Time	Date and Time	Depth to Water
1/24/2020	15:44	1/24/20 15:44	27.50
1/25/2020	7:28	1/25/20 7:28	27.35
1/25/2020	8:34	1/25/20 8:34	27.63
1/25/2020	9:38	1/25/20 9:38	27.68
1/25/2020	10:32	1/25/20 10:32	28.00
1/25/2020	11:34	1/25/20 11:34	28.02
1/25/2020	12:35	1/25/20 12:35	28.32
1/25/2020	13:33	1/25/20 13:33	28.35
1/25/2020	14:35	1/25/20 14:35	28.70
1/25/2020	15:26	1/25/20 15:26	28.72
1/25/2020	16:17	1/25/20 16:17	28.53
1/26/2020	7:19	1/26/20 7:19	27.25
1/26/2020	8:33	1/26/20 8:33	27.31
1/26/2020	9:33	1/26/20 9:33	27.32
1/26/2020	10:32	1/26/20 10:32	27.38
1/26/2020	11:23	1/26/20 11:23	27.39
1/26/2020	12:32	1/26/20 12:32	27.41
1/26/2020	13:34	1/26/20 13:34	27.41
1/26/2020	14:33	1/26/20 14:33	27.42
1/26/2020	15:32	1/26/20 15:32	27.42
1/26/2020	16:18	1/26/20 16:18	27.42
1/27/2020	8:13	1/27/20 8:13	27.11

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	MW-77-187
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	137 to 167 ft bgs
Approximate Distance from Testing Well	108 ft

Date	Time	Date and Time	Depth to Water
1/24/2020	15:49	1/24/20 15:49	27.22
1/25/2020	7:30	1/25/20 7:30	27.11
1/25/2020	8:33	1/25/20 8:33	27.28
1/25/2020	9:39	1/25/20 9:39	27.34
1/25/2020	10:30	1/25/20 10:30	27.60
1/25/2020	11:36	1/25/20 11:36	27.64
1/25/2020	12:33	1/25/20 12:33	27.84
1/25/2020	13:34	1/25/20 13:34	27.91
1/25/2020	14:33	1/25/20 14:33	28.12
1/25/2020	15:28	1/25/20 15:28	28.15
1/25/2020	16:17	1/25/20 16:17	27.35
1/26/2020	7:18	1/26/20 7:18	27.01
1/26/2020	8:34	1/26/20 8:34	27.06
1/26/2020	9:32	1/26/20 9:32	27.06
1/26/2020	10:33	1/26/20 10:33	27.11
1/26/2020	11:22	1/26/20 11:22	27.11
1/26/2020	12:35	1/26/20 12:35	27.12
1/26/2020	13:33	1/26/20 13:33	27.12
1/26/2020	14:34	1/26/20 14:34	27.12
1/26/2020	15:31	1/26/20 15:31	27.12
1/26/2020	16:31	1/26/20 16:31	27.11
1/27/2020	16:19	1/27/20 16:19	26.90

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	MW-82-046
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	137 to 167 ft bgs
Approximate Distance from Testing Well	120 ft

Date	Time	Date and Time	Depth to Water
1/24/2020	16:04	1/24/20 16:04	31.59
1/25/2020	7:24	1/25/20 7:24	31.75
1/25/2020	8:35	1/25/20 8:35	31.76
1/25/2020	9:41	1/25/20 9:41	31.75
1/25/2020	10:34	1/25/20 10:34	31.75
1/25/2020	11:41	1/25/20 11:41	31.75
1/25/2020	12:35	1/25/20 12:35	31.75
1/25/2020	13:41	1/25/20 13:41	31.76
1/25/2020	14:34	1/25/20 14:34	31.76
1/25/2020	15:33	1/25/20 15:33	31.76
1/25/2020	16:16	1/25/20 16:16	31.76
1/26/2020	7:18	1/26/20 7:18	31.78
1/26/2020	8:31	1/26/20 8:31	31.77
1/26/2020	9:48	1/26/20 9:48	31.77
1/26/2020	10:32	1/26/20 10:32	31.77
1/26/2020	11:48	1/26/20 11:48	31.76
1/26/2020	12:32	1/26/20 12:32	32.34
1/26/2020	13:44	1/26/20 13:44	31.77
1/26/2020	14:32	1/26/20 14:32	32.33
1/26/2020	15:39	1/26/20 15:39	32.34
1/26/2020	16:12	1/26/20 16:12	32.35
1/27/2020	8:21	1/27/20 8:21	31.59

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	MW-82-112
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	137 to 167 ft bgs
Approximate Distance from Testing Well	120 ft

Date	Time	Date and Time	Depth to Water
1/24/2020	16:06	1/24/20 16:06	32.32
1/25/2020	7:25	1/25/20 7:25	32.28
1/25/2020	8:34	1/25/20 8:34	32.32
1/25/2020	9:42	1/25/20 9:42	32.33
1/25/2020	10:33	1/25/20 10:33	32.37
1/25/2020	11:42	1/25/20 11:42	32.41
1/25/2020	12:34	1/25/20 12:34	32.45
1/25/2020	13:42	1/25/20 13:42	32.47
1/25/2020	14:34	1/25/20 14:34	32.51
1/25/2020	15:34	1/25/20 15:34	32.51
1/25/2020	16:15	1/25/20 16:15	32.44
1/26/2020	7:17	1/26/20 7:17	32.21
1/26/2020	8:32	1/26/20 8:32	32.28
1/26/2020	9:47	1/26/20 9:47	32.33
1/26/2020	10:33	1/26/20 10:33	32.39
1/26/2020	11:47	1/26/20 11:47	32.42
1/26/2020	12:33	1/26/20 12:33	32.46
1/26/2020	13:43	1/26/20 13:43	32.46
1/26/2020	14:33	1/26/20 14:33	32.49
1/26/2020	15:38	1/26/20 15:38	33.06
1/26/2020	16:13	1/26/20 16:13	32.98
1/27/2020	8:20	1/27/20 8:20	31.96

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

Location/Well ID	MW-82-168
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	137 to 167 ft bgs
Approximate Distance from Testing Well	120 ft

Date	Time	Date and Time	Depth to Water
1/24/2020	16:02	1/24/20 16:02	32.17
1/25/2020	7:36	1/25/20 7:36	32.14
1/25/2020	8:33	1/25/20 8:33	32.40
1/25/2020	9:44	1/25/20 9:44	32.46
1/25/2020	10:32	1/25/20 10:32	32.69
1/25/2020	11:43	1/25/20 11:43	32.74
1/25/2020	12:33	1/25/20 12:33	33.00
1/25/2020	13:43	1/25/20 13:43	33.03
1/25/2020	14:33	1/25/20 14:33	33.31
1/25/2020	15:35	1/25/20 15:35	33.33
1/25/2020	16:14	1/25/20 16:14	33.41
1/26/2020	7:16	1/26/20 7:16	32.08
1/26/2020	8:34	1/26/20 8:34	32.17
1/26/2020	9:46	1/26/20 9:46	32.19
1/26/2020	10:34	1/26/20 10:34	32.23
1/26/2020	11:46	1/26/20 11:46	32.24
1/26/2020	12:34	1/26/20 12:34	32.25
1/26/2020	13:42	1/26/20 13:42	32.25
1/26/2020	14:34	1/26/20 14:34	32.83
1/26/2020	15:37	1/26/20 15:37	32.81
1/26/2020	16:14	1/26/20 16:14	32.78
1/27/2020	8:18	1/27/20 8:18	31.82

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	MW-82-198
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	137 to 167 ft bgs
Approximate Distance from Testing Well	120 ft

Date	Time	Date and Time	Depth to Water
1/24/2020	16:03	1/24/20 16:03	31.89
1/25/2020	7:27	1/25/20 7:27	31.86
1/25/2020	8:32	1/25/20 8:32	32.08
1/25/2020	9:45	1/25/20 9:45	32.13
1/25/2020	10:31	1/25/20 10:31	32.32
1/25/2020	11:44	1/25/20 11:44	32.38
1/25/2020	12:32	1/25/20 12:32	32.57
1/25/2020	13:44	1/25/20 13:44	32.62
1/25/2020	14:32	1/25/20 14:32	32.83
1/25/2020	15:36	1/25/20 15:36	32.86
1/25/2020	16:13	1/25/20 16:13	32.16
1/26/2020	7:15	1/26/20 7:15	31.81
1/26/2020	8:35	1/26/20 8:35	31.88
1/26/2020	9:45	1/26/20 9:45	31.91
1/26/2020	10:34	1/26/20 10:34	31.94
1/26/2020	11:45	1/26/20 11:45	31.95
1/26/2020	12:35	1/26/20 12:35	31.96
1/26/2020	13:41	1/26/20 13:41	32.51
1/26/2020	14:35	1/26/20 14:35	32.50
1/26/2020	15:36	1/26/20 15:36	32.51
1/26/2020	16:15	1/26/20 16:15	32.46
1/27/2020	8:17	1/27/20 8:17	31.56

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

MW-31-060 During IRZ-17 Lower Screen (137 to 167 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-17: ~136 Feet
Legend
Transducer
Manual
Depth to Water (feet)
42.3
42.4
42.5
42.6
42.7
42.8
42.9
43
43.1
1/25/20 6:00
1/25/20 9:00
1/25/20 12:00
1/25/20 15:00
1/25/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 910.7 gal
Avg. Flow Rate: 8.06 gpm
Drawdown in IRZ-17: 4.54 ft
Specific Capacity: 1.78 gpm/ft
Step 2:
Total Volume Pumped: 1825.4 gal
Avg. Flow Rate: 15.14 gpm
Drawdown in IRZ-17: 9.55 ft
Specific Capacity: 1.58 gpm/ft
Step 3:
Total Volume Pumped: 2709.7 gal
Avg. Flow Rate: 22.65 gpm
Drawdown in IRZ-17: 14.77 ft
Specific Capacity: 1.53 gpm/ft
Step 4:
Total Volume Pumped: 3610.9 gal
Avg. Flow Rate: 30.08 gpm
Drawdown in IRZ-17: 20.45 ft
Specific Capacity: 1.47 gpm/ft

MW-31-135 During IRZ-17 Lower Screen (137 to 167 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-17: ~173 Feet
Legend
Transducer
Manual
Depth to Water (feet)
43.7
43.8
43.9
44
44.1
44.2
44.3
44.4
44.5
1/25/20 6:00
1/25/20 9:00
1/25/20 12:00
1/25/20 15:00
1/25/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 910.7 gal
Avg. Flow Rate: 8.06 gpm
Drawdown in IRZ-17: 4.54 ft
Specific Capacity: 1.78 gpm/ft
Step 2:
Total Volume Pumped: 1825.4 gal
Avg. Flow Rate: 15.14 gpm
Drawdown in IRZ-17: 9.55 ft
Specific Capacity: 1.58 gpm/ft
Step 3:
Total Volume Pumped: 2709.7 gal
Avg. Flow Rate: 22.65 gpm
Drawdown in IRZ-17: 14.77 ft
Specific Capacity: 1.53 gpm/ft
Step 4:
Total Volume Pumped: 3610.9 gal
Avg. Flow Rate: 30.08 gpm
Drawdown in IRZ-17: 20.45 ft
Specific Capacity: 1.47 gpm/ft

MW-77-046 During IRZ-17 Lower Screen (137 to 167 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-17: ~103 Feet
Legend
Transducer
Manual
Depth to Water (feet)
26
26.1
26.2
26.3
26.4
26.5
26.6
26.7
26.8
1/25/20 6:00
1/25/20 9:00
1/25/20 12:00
1/25/20 15:00
1/25/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 910.7 gal
Avg. Flow Rate: 8.06 gpm
Drawdown in IRZ-17: 4.54 ft
Specific Capacity: 1.78 gpm/ft
Step 2:
Total Volume Pumped: 1825.4 gal
Avg. Flow Rate: 15.14 gpm
Drawdown in IRZ-17: 9.55 ft
Specific Capacity: 1.58 gpm/ft
Step 3:
Total Volume Pumped: 2709.7 gal
Avg. Flow Rate: 22.65 gpm
Drawdown in IRZ-17: 14.77 ft
Specific Capacity: 1.53 gpm/ft
Step 4:
Total Volume Pumped: 3610.9 gal
Avg. Flow Rate: 30.08 gpm
Drawdown in IRZ-17: 20.45 ft
Specific Capacity: 1.47 gpm/ft

MW-77-102 During IRZ-17 Lower Screen (137 to 167 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Transducer was not used
Distance to IRZ-17: ~113 Feet
Legend
Manual
Depth to Water (feet)
26.6
26.7
26.8
26.9
27.0
27.1
27.2
27.3
Step 1:
Total Volume Pumped: 910.7 gal
Avg. Flow Rate: 8.06 gpm
Drawdown in IRZ-17: 4.54 ft
Specific Capacity: 1.78 gpm/ft
Step 2:
Total Volume Pumped: 1825.4 gal
Avg. Flow Rate: 15.14 gpm
Drawdown in IRZ-17: 9.55 ft
Specific Capacity: 1.58 gpm/ft
Step 3:
Total Volume Pumped: 2709.7 gal
Avg. Flow Rate: 22.65 gpm
Drawdown in IRZ-17: 14.77 ft
Specific Capacity: 1.53 gpm/ft
Step 4:
Total Volume Pumped: 3610.9 gal
Avg. Flow Rate: 30.08 gpm
Drawdown in IRZ-17: 20.45 ft
Specific Capacity: 1.47 gpm/ft
1/25/20 6:00
1/25/20 9:00
1/25/20 12:00
1/25/20 15:00
1/25/20 18:00
Date and Time

MW-77-158 During IRZ-17 Lower Screen (137 to 167 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-17: ~108 Feet
Legend
Transducer
Manual
Depth to Water (feet)
26.9
27.4
27.9
28.4
28.9
29.4
1/25/20 6:00
1/25/20 9:00
1/25/20 12:00
1/25/20 15:00
1/25/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 910.7 gal
Avg. Flow Rate: 8.06 gpm
Drawdown in IRZ-17: 4.54 ft
Specific Capacity: 1.78 gpm/ft
Step 2:
Total Volume Pumped: 1825.4 gal
Avg. Flow Rate: 15.14 gpm
Drawdown in IRZ-17: 9.55 ft
Specific Capacity: 1.58 gpm/ft
Step 3:
Total Volume Pumped: 2709.7 gal
Avg. Flow Rate: 22.65 gpm
Drawdown in IRZ-17: 14.77 ft
Specific Capacity: 1.53 gpm/ft
Step 4:
Total Volume Pumped: 3610.9 gal
Avg. Flow Rate: 30.08 gpm
Drawdown in IRZ-17: 20.45 ft
Specific Capacity: 1.47 gpm/ft

MW-77-187 During IRZ-17 Lower Screen (137 to 167 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Transducer was not used
Distance to IRZ-17: ~108 Feet
Legend
Manual
Depth to Water (feet)
26.8
27.0
27.2
27.4
27.6
27.8
28.0
28.2
28.4
28.6
1/25/20 6:00
1/25/20 9:00
1/25/20 12:00
1/25/20 15:00
1/25/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 910.7 gal
Avg. Flow Rate: 8.06 gpm
Drawdown in IRZ-17: 4.54 ft
Specific Capacity: 1.78 gpm/ft
Step 2:
Total Volume Pumped: 1825.4 gal
Avg. Flow Rate: 15.14 gpm
Drawdown in IRZ-17: 9.55 ft
Specific Capacity: 1.58 gpm/ft
Step 3:
Total Volume Pumped: 2709.7 gal
Avg. Flow Rate: 22.65 gpm
Drawdown in IRZ-17: 14.77 ft
Specific Capacity: 1.53 gpm/ft
Step 4:
Total Volume Pumped: 3610.9 gal
Avg. Flow Rate: 30.08 gpm
Drawdown in IRZ-17: 20.45 ft
Specific Capacity: 1.47 gpm/ft

MW-82-046 During IRZ-17 Lower Screen (137 to 167 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-17: ~120 Feet
Legend
Transducer
Manual
Depth to Water (feet)
31.5
31.6
31.7
31.8
31.9
32.0
32.1
1/25/20 6:00
1/25/20 9:00
1/25/20 12:00
1/25/20 15:00
1/25/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 910.7 gal
Avg. Flow Rate: 8.06 gpm
Drawdown in IRZ-17: 4.54 ft
Specific Capacity: 1.78 gpm/ft
Step 2:
Total Volume Pumped: 1825.4 gal
Avg. Flow Rate: 15.14 gpm
Drawdown in IRZ-17: 9.55 ft
Specific Capacity: 1.58 gpm/ft
Step 3:
Total Volume Pumped: 2709.7 gal
Avg. Flow Rate: 22.65 gpm
Drawdown in IRZ-17: 14.77 ft
Specific Capacity: 1.53 gpm/ft
Step 4:
Total Volume Pumped: 3610.9 gal
Avg. Flow Rate: 30.08 gpm
Drawdown in IRZ-17: 20.45 ft
Specific Capacity: 1.47 gpm/ft

MW-82-112 During IRZ-17 Lower Screen (137 to 167 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Transducer was not used
Distance to IRZ-17: ~120 Feet
Legend
Manual
Depth to Water (feet)
32.0
32.1
32.2
32.3
32.4
32.5
32.6
32.7
Step 1:
Total Volume Pumped: 910.7 gal
Avg. Flow Rate: 8.06 gpm
Drawdown in IRZ-17: 4.54 ft
Specific Capacity: 1.78 gpm/ft
Step 2:
Total Volume Pumped: 1825.4 gal
Avg. Flow Rate: 15.14 gpm
Drawdown in IRZ-17: 9.55 ft
Specific Capacity: 1.58 gpm/ft
Step 3:
Total Volume Pumped: 2709.7 gal
Avg. Flow Rate: 22.65 gpm
Drawdown in IRZ-17: 14.77 ft
Specific Capacity: 1.53 gpm/ft
Step 4:
Total Volume Pumped: 3610.9 gal
Avg. Flow Rate: 30.08 gpm
Drawdown in IRZ-17: 20.45 ft
Specific Capacity: 1.47 gpm/ft
1/25/20 6:00
1/25/20 9:00
1/25/20 12:00
1/25/20 15:00
1/25/20 18:00
Date and Time

MW-82-168 During IRZ-17 Lower Screen (137 to 167 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-17: ~120 Feet
Legend
Transducer
Manual
Depth to Water (feet)
31.8
32.0
32.2
32.4
32.6
32.8
33.0
33.2
33.4
33.6
33.8
1/25/20 6:00
1/25/20 9:00
1/25/20 12:00
1/25/20 15:00
1/25/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 910.7 gal
Avg. Flow Rate: 8.06 gpm
Drawdown in IRZ-17: 4.54 ft
Specific Capacity: 1.78 gpm/ft
Step 2:
Total Volume Pumped: 1825.4 gal
Avg. Flow Rate: 15.14 gpm
Drawdown in IRZ-17: 9.55 ft
Specific Capacity: 1.58 gpm/ft
Step 3:
Total Volume Pumped: 2709.7 gal
Avg. Flow Rate: 22.65 gpm
Drawdown in IRZ-17: 14.77 ft
Specific Capacity: 1.53 gpm/ft
Step 4:
Total Volume Pumped: 3610.9 gal
Avg. Flow Rate: 30.08 gpm
Drawdown in IRZ-17: 20.45 ft
Specific Capacity: 1.47 gpm/ft

MW-82-198 During IRZ-17 Lower Screen (137 to 167 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Transducer was not used
Distance to IRZ-17: ~120 Feet
Legend
Manual
Depth to Water (feet)
31.4
31.6
31.8
32.0
32.2
32.4
32.6
32.8
33.0
33.2
33.4
1/25/20 6:00
1/25/20 9:00
1/25/20 12:00
1/25/20 15:00
1/25/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 910.7 gal
Avg. Flow Rate: 8.06 gpm
Drawdown in IRZ-17: 4.54 ft
Specific Capacity: 1.78 gpm/ft
Step 2:
Total Volume Pumped: 1825.4 gal
Avg. Flow Rate: 15.14 gpm
Drawdown in IRZ-17: 9.55 ft
Specific Capacity: 1.58 gpm/ft
Step 3:
Total Volume Pumped: 2709.7 gal
Avg. Flow Rate: 22.65 gpm
Drawdown in IRZ-17: 14.77 ft
Specific Capacity: 1.53 gpm/ft
Step 4:
Total Volume Pumped: 3610.9 gal
Avg. Flow Rate: 30.08 gpm
Drawdown in IRZ-17: 20.45 ft
Specific Capacity: 1.47 gpm/ft

Injectivity Testing

Location/Well ID	**IRZ-17**
Date	**1/29/2020**
Screened Interval Tested	**Upper (36 to 57 ft bgs)**
Packer Set Depth	**91 to 95 ft btoc**
Packer Seal Test	Confirmed packer to be watertight before test
Tests Conducted	Four-step injectivity test (7.7, 15.1, 22.7, 30.1)
Purpose	Well performance test
Summary	Specific injectivity: 17.16 to 17.93 gpm/ft
Injection Water Source	Fresh water from construction water supply system
Notes	Fresh water tank refilled from ~10:20 to ~12:35
	Flow rate adjusted at 10:25
	Fresh water tank refilled from ~12:55 to ~13:10
	Deep screen at RB-3 was pumped from 14:05 to 14:21 at 100 gpm
	Fresh water tank refilled from ~14:29 to ~14:36
	Deep screen at RB-3 was pumped from 14:52 to 14:32 at 100 gpm
Oversight Signature	
Date	2/24/2020

Acronyms & Abbreviations
bgs = below ground surface
btoc = below top of casing
ft = feet
gpm = gallons per minute

Injectivity Test

Location/Well ID	IRZ-17 (Upper)
Date	1/29/2020
Screened Interval	36 to 57 ft bgs
Injection Depth (ft btoc)	39.00
Packer Depth (ft btoc)	91.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 36' to 57' ft btoc	27.47
Initial Water Level Within 137' to 167' ft btoc	27.35
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	9065.82
Approx Injected Volume (gal)	9065.82
Calculated Volume Purged (gal)	25.76
Difference in Volume Pumped vs. Calculated	9040.06
Number of Specific Capacity Steps	4
Pumping Rates (in order)	7.7, 15.1, 22.7, 30.1 gpm

Step 1 - Time (HR:MN:SEC)	Elapsed Time (min)	Injection Rate (gpm)	Total Volume Injected (gal)	Depth to Water (ft)	Water Level Change (ft)
8:00:00	0.00	0.00	0.00	27.47	0.00
8:00:20	0.33	8.84	2.95	26.58	0.89
8:00:40	0.67	7.34	5.39	27.12	0.35
8:01:00	1.00	7.48	7.89	27.11	0.36
8:02:00	2.00	7.62	15.51	27.08	0.39
8:03:00	3.00	7.62	23.13	27.08	0.39
8:04:00	4.00	7.64	30.77	27.07	0.40
8:05:00	5.00	7.62	38.39	27.07	0.40
8:06:00	6.00	7.60	45.99	27.06	0.41
8:07:00	7.00	7.60	53.59	27.06	0.41
8:08:00	8.00	7.62	61.21	27.06	0.41
8:09:00	9.00	7.62	68.83	27.05	0.42
8:10:00	10.00	7.62	76.45	27.05	0.42
8:12:00	12.00	7.60	91.65	27.04	0.43
8:14:00	14.00	7.60	106.85	27.04	0.43
8:16:00	16.00	7.60	122.05	27.04	0.43
8:17:00	17.00	7.62	129.67	27.04	0.43
8:20:00	20.00	7.62	152.53	27.05	0.42
8:22:00	22.00	7.60	167.73	27.05	0.42
8:24:00	24.00	7.60	182.93	27.05	0.42
8:26:00	26.00	7.58	198.09	27.04	0.43
8:28:00	28.00	7.62	213.33	27.04	0.43
8:30:00	30.00	7.60	228.53	27.03	0.44
8:35:00	35.00	7.60	266.53	27.03	0.44
8:40:00	40.00	7.60	304.53	27.02	0.45
8:45:00	45.00	7.60	342.53	27.03	0.44
8:50:00	50.00	7.60	380.53	27.03	0.44
8:55:00	55.00	7.58	418.43	27.02	0.45
9:00:00	60.00	7.62	456.53	27.03	0.44
9:10:00	70.00	7.71	533.63	27.02	0.45
9:20:00	80.00	7.74	611.03	27.02	0.45
9:30:00	90.00	7.74	688.43	27.02	0.45
9:40:00	100.00	7.67	765.13	27.02	0.45
9:50:00	110.00	7.71	842.23	27.01	0.46
10:00:00	120.00	7.71	919.33	27.03	0.44

Total Volume Injected During Step (GAL):	919.33
Average Injection Rate (GPM):	7.65
Specific Injectivity (GPM/FT):	17.39

Injectivity Test

Location/Well ID	IRZ-17 (Upper)
Date	1/29/2020
Screened Interval	36 to 57 ft bgs
Injection Depth (ft btoc)	39.00
Packer Depth (ft btoc)	91.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 36' to 57' ft btoc	27.47
Initial Water Level Within 137' to 167' ft btoc	27.35
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	9065.82
Approx Injected Volume (gal)	9065.82
Calculated Volume Purged (gal)	25.76
Difference in Volume Pumped vs. Calculated	9040.06
Number of Specific Capacity Steps	4
Pumping Rates (in order)	7.7, 15.1, 22.7, 30.1 gpm

Step 2 - Time (HR:MN:SEC)	Elapsed Time (min)	Injection Rate (gpm)	Total Volume Injected (gal)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 2 Start (min)
10:00:20	120.33	13.22	923.73	26.89	0.58	0.33
10:00:40	120.67	15.08	928.76	26.76	0.71	0.67
10:01:00	121.00	15.12	933.80	26.70	0.77	1.00
10:02:00	122.00	15.16	948.96	26.66	0.81	2.00
10:03:00	123.00	15.16	964.12	26.65	0.82	3.00
10:04:00	124.00	15.14	979.26	26.64	0.83	4.00
10:05:00	125.00	15.12	994.38	26.63	0.84	5.00
10:06:00	126.00	15.16	1009.54	26.63	0.84	6.00
10:07:00	127.00	15.14	1024.68	26.63	0.84	7.00
10:08:00	128.00	15.14	1039.82	26.62	0.85	8.00
10:09:00	129.00	15.14	1054.96	26.62	0.85	9.00
10:10:00	130.00	15.16	1070.12	26.62	0.85	10.00
10:12:00	132.00	15.18	1100.48	26.62	0.85	12.00
10:14:00	134.00	15.18	1130.84	26.61	0.86	14.00
10:16:00	136.00	15.12	1161.08	26.61	0.86	16.00
10:18:00	138.00	15.10	1191.28	26.61	0.86	18.00
10:20:00	140.00	15.16	1221.60	26.61	0.86	20.00
10:22:00	142.00	15.18	1251.96	26.61	0.86	22.00
10:24:00	144.00	14.73	1281.42	26.62	0.85	24.00
10:26:00	146.00	15.06	1311.54	26.62	0.85	26.00
10:28:00	148.00	15.10	1341.74	26.61	0.86	28.00
10:30:00	150.00	15.28	1372.30	26.60	0.87	30.00
10:35:00	155.00	15.10	1447.80	26.60	0.87	35.00
10:40:00	160.00	15.10	1523.30	26.60	0.87	40.00
10:45:00	165.00	15.14	1599.00	26.59	0.88	45.00
10:50:00	170.00	15.14	1674.70	26.60	0.87	50.00
10:55:00	175.00	15.12	1750.30	26.60	0.87	55.00
11:00:00	180.00	15.10	1825.80	26.59	0.88	60.00
11:10:00	190.00	15.10	1976.80	26.59	0.88	70.00
11:20:00	200.00	15.08	2127.60	26.60	0.87	80.00
11:30:00	210.00	15.10	2278.60	26.60	0.87	90.00
11:40:00	220.00	15.10	2429.60	26.60	0.87	100.00
11:50:00	230.00	15.08	2580.40	26.60	0.87	110.00
12:00:00	240.00	15.08	2731.20	26.63	0.84	120.00

Total Volume Injected During Step (GAL):	1811.87
Average Injection Rate (GPM):	15.06
Specific Injectivity (GPM/FT):	17.93

Injectivity Test

Location/Well ID	IRZ-17 (Upper)
Date	1/29/2020
Screened Interval	36 to 57 ft bgs
Injection Depth (ft btoc)	39.00
Packer Depth (ft btoc)	91.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 36' to 57' ft btoc	27.47
Initial Water Level Within 137' to 167' ft btoc	27.35
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	9065.82
Approx Injected Volume (gal)	9065.82
Calculated Volume Purged (gal)	25.76
Difference in Volume Pumped vs. Calculated	9040.06
Number of Specific Capacity Steps	4
Pumping Rates (in order)	7.7, 15.1, 22.7, 30.1 gpm

Step 3 - Time (HR:MN:SEC)	Elapsed Time (min)	Injection Rate (gpm)	Total Volume Injected (gal)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 3 Start (min)
12:00:20	240.33	23.18	2738.93	26.30	1.17	0.33
12:00:40	240.67	22.68	2746.49	26.28	1.19	0.67
12:01:00	241.00	22.66	2754.04	26.26	1.21	1.00
12:02:00	242.00	22.60	2776.64	26.23	1.24	2.00
12:03:00	243.00	22.96	2799.60	26.22	1.25	3.00
12:04:00	244.00	22.70	2822.30	26.22	1.25	4.00
12:05:00	245.00	22.66	2844.96	26.22	1.25	5.00
12:06:00	246.00	22.66	2867.62	26.22	1.25	6.00
12:07:00	247.00	22.66	2890.28	26.21	1.26	7.00
12:08:00	248.00	22.66	2912.94	26.21	1.26	8.00
12:09:00	249.00	22.66	2935.60	26.21	1.26	9.00
12:10:00	250.00	22.64	2958.24	26.21	1.26	10.00
12:12:00	252.00	22.64	3003.52	26.21	1.26	12.00
12:14:00	254.00	22.64	3048.80	26.20	1.27	14.00
12:16:00	256.00	22.62	3094.04	26.20	1.27	16.00
12:18:00	258.00	22.62	3139.28	26.21	1.26	18.00
12:20:00	260.00	22.62	3184.52	26.20	1.27	20.00
12:22:00	262.00	22.62	3229.76	26.20	1.27	22.00
12:24:00	264.00	22.60	3274.96	26.20	1.27	24.00
12:26:00	266.00	22.62	3320.20	26.21	1.26	26.00
12:28:00	268.00	22.60	3365.40	26.20	1.27	28.00
12:30:00	270.00	22.60	3410.60	26.20	1.27	30.00
12:35:00	275.00	22.62	3523.70	26.20	1.27	35.00
12:40:00	280.00	22.60	3636.70	26.19	1.28	40.00
12:45:00	285.00	22.58	3749.60	26.18	1.29	45.00
12:50:00	290.00	22.58	3862.50	26.18	1.29	50.00
12:55:00	295.00	22.62	3975.60	26.18	1.29	55.00
13:00:00	300.00	22.68	4089.00	26.17	1.30	60.00
13:10:00	310.00	22.62	4315.20	26.16	1.31	70.00
13:20:00	320.00	22.51	4540.30	26.14	1.33	80.00
13:30:00	330.00	22.85	4768.80	26.16	1.31	90.00
13:40:00	340.00	22.56	4994.40	26.16	1.31	100.00
13:50:00	350.00	22.56	5220.00	26.15	1.32	110.00
14:00:00	360.00	22.53	5445.30	26.15	1.32	120.00

Total Volume Injected During Step (GAL):	2714.10
Average Injection Rate (GPM):	22.65
Specific Injectivity (GPM/FT):	17.16

Injectivity Test

Location/Well ID	IRZ-17 (Upper)
Date	1/29/2020
Screened Interval	36 to 57 ft bgs
Injection Depth (ft btoc)	39.00
Packer Depth (ft btoc)	91.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 36' to 57' ft btoc	27.47
Initial Water Level Within 137' to 167' ft btoc	27.35
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	9065.82
Approx Injected Volume (gal)	9065.82
Calculated Volume Purged (gal)	25.76
Difference in Volume Pumped vs. Calculated	9040.06
Number of Specific Capacity Steps	4
Pumping Rates (in order)	7.7, 15.1, 22.7, 30.1 gpm

Step 4 - Time (HR:MN:SEC)	Elapsed Time (min)	Injection Rate (gpm)	Total Volume Injected (gal)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 4 Start (min)
14:00:20	360.33	28.60	5454.83	25.87	1.60	0.33
14:00:40	360.67	29.94	5464.81	25.85	1.62	0.67
14:01:00	361.00	30.22	5474.89	25.82	1.65	1.00
14:02:00	362.00	30.18	5505.07	25.78	1.69	2.00
14:03:00	363.00	30.18	5535.25	25.77	1.70	3.00
14:04:00	364.00	30.20	5565.45	25.76	1.71	4.00
14:05:00	365.00	30.18	5595.63	25.75	1.72	5.00
14:06:00	366.00	30.14	5625.77	25.75	1.72	6.00
14:07:00	367.00	30.16	5655.93	25.75	1.72	7.00
14:08:00	368.00	30.16	5686.09	25.74	1.73	8.00
14:09:00	369.00	30.20	5716.29	25.74	1.73	9.00
14:10:00	370.00	30.18	5746.47	25.74	1.73	10.00
14:12:00	372.00	30.18	5806.83	25.74	1.73	12.00
14:14:00	374.00	30.18	5867.19	25.74	1.73	14.00
14:16:00	376.00	30.18	5927.55	25.74	1.73	16.00
14:18:00	378.00	30.18	5987.91	25.74	1.73	18.00
14:20:00	380.00	30.16	6048.23	25.74	1.73	20.00
14:22:00	382.00	30.18	6108.59	25.75	1.72	22.00
14:24:00	384.00	30.16	6168.91	25.75	1.72	24.00
14:26:00	386.00	30.20	6229.31	25.75	1.72	26.00
14:28:00	388.00	30.22	6289.75	25.76	1.71	28.00
14:30:00	390.00	30.22	6350.19	25.75	1.72	30.00
14:35:00	395.00	30.18	6501.09	25.73	1.74	35.00
14:40:00	400.00	30.10	6651.59	25.74	1.73	40.00
14:45:00	405.00	30.16	6802.39	25.74	1.73	45.00
14:50:00	410.00	30.16	6953.19	25.75	1.72	50.00
14:55:00	415.00	30.14	7103.89	25.75	1.72	55.00
15:00:00	420.00	30.18	7254.79	25.75	1.72	60.00
15:10:00	430.00	30.18	7556.59	25.76	1.71	70.00
15:20:00	440.00	30.14	7857.99	25.78	1.69	80.00
15:30:00	450.00	30.18	8159.79	25.79	1.68	90.00
15:40:00	460.00	30.16	8461.39	25.80	1.67	100.00
15:50:00	470.00	30.14	8762.79	25.78	1.69	110.00
16:00:00	480.00	30.09	9063.69	25.79	1.68	120.00
16:01:00	481.00	0.00	9063.69	27.16	0.31	121.00
16:02:00	482.00	0.00	9063.69	27.28	0.19	122.00
16:03:00	483.00	0.00	9063.69	27.32	0.15	123.00
16:04:00	484.00	0.00	9063.69	27.38	0.09	124.00
16:05:00	485.00	0.00	9063.69	27.40	0.07	125.00
16:06:00	486.00	0.00	9063.69	27.42	0.05	126.00
16:07:00	487.00	0.00	9063.69	27.42	0.05	127.00
16:08:00	488.00	0.00	9063.69	27.42	0.05	128.00
16:09:00	489.00	0.00	9063.69	27.43	0.04	129.00
16:10:00	490.00	0.00	9063.69	27.45	0.02	130.00

Total Volume Injected During Step (GAL):	3618.39
Average Injection Rate (GPM):	30.12
Specific Injectivity (GPM/FT):	17.93

Acronyms & Abbreviations
bgs = below ground surface
btoc = below top of casing
ft = feet
gal = gallons
gpm = gallons per minute
min = minutes

IRZ-17 Upper Screen (36 to 57 ft) Linear Change in Water Level Plot
Change in Water Level (feet)
Elapsed Time (min)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
100
200
300
400
500
600
700
Legend
Transducer
Manual
Fresh water tank refilled from ~14:29 to ~14:36
Deep screen at RB-3 was pumped from 14:05 to 14:21 at 100 gpm
Deep screen at RB-3 was pumped from 14:52 to 14:32 at 100 gpm
Step 4:
Total Volume Pumped: 3618.39 gal
Avg. Flow Rate: 30.12 gpm
Change in Water Level: 1.68 ft
Specific Capacity: 17.93 gpm/ft
Fresh water tank refilled from ~12:55 to ~13:10
Step 3:
Total Volume Pumped: 2714.10 gal
Avg. Flow Rate: 22.65 gpm
Change in Water Level: 1.32 ft
Specific Capacity: 17.16 gpm/ft
Flow rate adjusted at 10:25
Fresh water tank refilled from ~10:20 to ~12:35
Step 2:
Total Volume Pumped: 1811.87 gal
Avg. Flow Rate: 15.06 gpm
Change in Water Level: 0.84 ft
Specific Capacity: 17.93 gpm/ft
Recovery
Step 1:
Total Volume Pumped: 919.33 gal
Avg. Flow Rate: 7.65 gpm
Change in Water Level: 0.44 ft
Specific Capacity: 17.39 gpm/ft

IRZ-17 Upper Screen (36 to 57 ft) Semi-Log Change in Water Level Plot

Specific Capacity/
Injection Test Monitoring Point

Location/Well ID	MW-31-060
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	36 to 57 ft bgs
Approximate Distance from Testing Well	136 ft

Date	Time	Date and Time	Depth to Water
1/27/2020	14:24	1/27/20 14:24	42.54
1/27/2020	16:32	1/27/20 16:32	42.52
1/28/2020	7:45	1/28/20 7:45	42.50
1/28/2020	8:39	1/28/20 8:39	42.49
1/28/2020	9:46	1/28/20 9:46	42.47
1/28/2020	10:38	1/28/20 10:38	42.44
1/28/2020	11:45	1/28/20 11:45	42.41
1/28/2020	12:36	1/28/20 12:36	42.39
1/28/2020	13:45	1/28/20 13:45	42.36
1/28/2020	14:38	1/28/20 14:38	42.36
1/28/2020	15:46	1/28/20 15:46	42.33
1/28/2020	16:19	1/28/20 16:19	42.34
1/29/2020	7:40	1/29/20 7:40	42.35
1/29/2020	8:38	1/29/20 8:38	42.28
1/29/2020	9:47	1/29/20 9:47	42.25
1/29/2020	10:44	1/29/20 10:44	42.22
1/29/2020	11:48	1/29/20 11:48	42.20
1/29/2020	12:40	1/29/20 12:40	42.19
1/29/2020	13:48	1/29/20 13:48	42.16
1/29/2020	14:42	1/29/20 14:42	42.15
1/29/2020	15:48	1/29/20 15:48	42.18
1/29/2020	16:20	1/29/20 16:20	42.28
1/30/2020	8:55	1/30/20 8:55	42.51

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	**MW-31-135**
Well Being Tested	**IRZ-17**
Screened Interval of Well Being Tested	**36 to 57 ft bgs**
Approximate Distance from Testing Well	**173 ft**

Date	Time	Date and Time	Depth to Water
1/27/2020	14:23	1/27/20 14:23	43.99
1/27/2020	16:34	1/27/20 16:34	43.98
1/28/2020	7:46	1/28/20 7:46	43.86
1/28/2020	8:38	1/28/20 8:38	43.84
1/28/2020	9:47	1/28/20 9:47	43.84
1/28/2020	10:37	1/28/20 10:37	43.80
1/28/2020	11:47	1/28/20 11:47	43.79
1/28/2020	12:35	1/28/20 12:35	43.75
1/28/2020	13:47	1/28/20 13:47	43.72
1/28/2020	14:37	1/28/20 14:37	43.66
1/28/2020	15:47	1/28/20 15:47	43.63
1/28/2020	16:18	1/28/20 16:18	43.72
1/29/2020	7:41	1/29/20 7:41	43.70
1/29/2020	8:37	1/29/20 8:37	43.67
1/29/2020	9:48	1/29/20 9:48	43.70
1/29/2020	10:43	1/29/20 10:43	43.71
1/29/2020	11:49	1/29/20 11:49	43.74
1/29/2020	12:38	1/29/20 12:38	43.76
1/29/2020	13:49	1/29/20 13:49	43.78
1/29/2020	14:41	1/29/20 14:41	43.81
1/29/2020	15:49	1/29/20 15:49	43.89
1/29/2020	16:19	1/29/20 16:19	43.89
1/30/2020	8:54	1/30/20 8:54	44.02

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	MW-77-046R
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	36 to 57 ft bgs
Approximate Distance from Testing Well	103 ft

Date	Time	Date and Time	Depth to Water
1/27/2020	14:05	1/27/20 14:05	26.25
1/27/2020	16:27	1/27/20 16:27	26.21
1/28/2020	7:32	1/28/20 7:32	26.20
1/28/2020	8:37	1/28/20 8:37	26.19
1/28/2020	9:41	1/28/20 9:41	26.19
1/28/2020	10:45	1/28/20 10:45	26.18
1/28/2020	11:41	1/28/20 11:41	26.17
1/28/2020	12:36	1/28/20 12:36	26.14
1/28/2020	13:41	1/28/20 13:41	26.15
1/28/2020	14:36	1/28/20 14:36	26.15
1/28/2020	15:42	1/28/20 15:42	26.15
1/28/2020	16:17	1/28/20 16:17	26.14
1/29/2020	7:35	1/29/20 7:35	26.13
1/29/2020	8:35	1/29/20 8:35	26.07
1/29/2020	9:41	1/29/20 9:41	26.11
1/29/2020	10:36	1/29/20 10:36	26.03
1/29/2020	11:42	1/29/20 11:42	26.02
1/29/2020	12:37	1/29/20 12:37	26.02
1/29/2020	13:42	1/29/20 13:42	26.04
1/29/2020	14:37	1/29/20 14:37	26.02
1/29/2020	15:42	1/29/20 15:42	26.02
1/29/2020	16:16	1/29/20 16:16	26.12
1/30/2020	8:00	1/30/20 8:00	26.19

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	**MW-77-102**
Well Being Tested	**IRZ-17**
Screened Interval of Well Being Tested	**36 to 57 ft bgs**
Approximate Distance from Testing Well	**113 ft**

Date	Time	Date and Time	Depth to Water
1/27/2020	14:11	1/27/20 14:11	26.81
1/27/2020	16:24	1/27/20 16:24	26.80
1/28/2020	7:35	1/28/20 7:35	26.56
1/28/2020	8:33	1/28/20 8:33	26.54
1/28/2020	9:45	1/28/20 9:45	26.57
1/28/2020	10:31	1/28/20 10:31	26.55
1/28/2020	11:45	1/28/20 11:45	26.56
1/28/2020	12:32	1/28/20 12:32	26.52
1/28/2020	13:45	1/28/20 13:45	26.49
1/28/2020	14:32	1/28/20 14:32	26.42
1/28/2020	15:46	1/28/20 15:46	26.36
1/28/2020	16:14	1/28/20 16:14	26.46
1/29/2020	7:39	1/29/20 7:39	26.38
1/29/2020	8:31	1/29/20 8:31	26.40
1/29/2020	9:46	1/29/20 9:46	26.45
1/29/2020	10:32	1/29/20 10:32	26.50
1/29/2020	11:45	1/29/20 11:45	26.53
1/29/2020	12:31	1/29/20 12:31	26.58
1/29/2020	13:46	1/29/20 13:46	26.60
1/29/2020	14:31	1/29/20 14:31	26.69
1/29/2020	15:45	1/29/20 15:45	26.72
1/29/2020	16:12	1/29/20 16:12	26.74
1/30/2020	8:05	1/30/20 8:05	26.71

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

Location/Well ID	MW-77-158
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	36 to 57 ft bgs
Approximate Distance from Testing Well	108 ft

Date	Time	Date and Time	Depth to Water
1/27/2020	14:08	1/27/20 14:08	27.35
1/27/2020	16:25	1/27/20 16:25	27.34
1/28/2020	7:34	1/28/20 7:34	27.03
1/28/2020	8:34	1/28/20 8:34	26.80
1/28/2020	9:43	1/28/20 9:43	26.86
1/28/2020	10:32	1/28/20 10:32	26.60
1/28/2020	11:44	1/28/20 11:44	26.58
1/28/2020	12:33	1/28/20 12:33	26.23
1/28/2020	13:44	1/28/20 13:44	26.22
1/28/2020	14:33	1/28/20 14:33	25.88
1/28/2020	15:44	1/28/20 15:44	25.78
1/28/2020	16:15	1/28/20 16:15	26.85
1/29/2020	7:37	1/29/20 7:37	26.89
1/29/2020	8:32	1/29/20 8:32	26.91
1/29/2020	9:44	1/29/20 9:44	26.96
1/29/2020	10:33	1/29/20 10:33	27.00
1/29/2020	11:44	1/29/20 11:44	27.04
1/29/2020	12:32	1/29/20 12:32	27.11
1/29/2020	13:45	1/29/20 13:45	27.15
1/29/2020	14:33	1/29/20 14:33	27.41
1/29/2020	15:44	1/29/20 15:44	27.59
1/29/2020	16:14	1/29/20 16:14	27.38
1/30/2020	8:03	1/30/20 8:03	27.22

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	MW-77-187
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	36 to 57 ft bgs
Approximate Distance from Testing Well	108 ft

Date	Time	Date and Time	Depth to Water
1/27/2020	14:07	1/27/20 14:07	27.11
1/27/2020	16:26	1/27/20 16:26	27.08
1/28/2020	7:33	1/28/20 7:33	26.81
1/28/2020	8:36	1/28/20 8:36	26.65
1/28/2020	9:41	1/28/20 9:41	26.70
1/28/2020	10:43	1/28/20 10:43	26.53
1/28/2020	11:42	1/28/20 11:42	26.51
1/28/2020	12:34	1/28/20 12:34	26.27
1/28/2020	13:42	1/28/20 13:42	26.22
1/28/2020	14:35	1/28/20 14:35	25.98
1/28/2020	14:43	1/28/20 14:43	25.90
1/28/2020	16:16	1/28/20 16:16	26.54
1/29/2020	7:36	1/29/20 7:36	26.64
1/29/2020	8:33	1/29/20 8:33	26.66
1/29/2020	9:42	1/29/20 9:42	26.71
1/29/2020	10:34	1/29/20 10:34	26.76
1/29/2020	11:43	1/29/20 11:43	26.80
1/29/2020	12:35	1/29/20 12:35	26.86
1/29/2020	13:43	1/29/20 13:43	26.90
1/29/2020	14:34	1/29/20 14:34	27.23
1/29/2020	15:43	1/29/20 15:43	26.60
1/29/2020	16:15	1/29/20 16:15	27.20
1/30/2020	8:01	1/30/20 8:01	26.97

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	MW-82-046
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	36 to 57 ft bgs
Approximate Distance from Testing Well	120 ft

Date	Time	Date and Time	Depth to Water
1/27/2020	14:05	1/27/20 14:05	32.34
1/27/2020	16:28	1/27/20 16:28	32.35
1/28/2020	7:28	1/28/20 7:28	31.65
1/28/2020	8:37	1/28/20 8:37	31.61
1/28/2020	9:41	1/28/20 9:41	31.61
1/28/2020	10:35	1/28/20 10:35	31.61
1/28/2020	11:41	1/28/20 11:41	31.61
1/28/2020	12:33	1/28/20 12:33	31.61
1/28/2020	13:41	1/28/20 13:41	31.61
1/28/2020	14:35	1/28/20 14:35	31.61
1/28/2020	15:41	1/28/20 15:41	31.61
1/28/2020	16:13	1/28/20 16:13	31.61
1/29/2020	7:35	1/29/20 7:35	31.63
1/29/2020	8:35	1/29/20 8:35	31.62
1/29/2020	9:42	1/29/20 9:42	31.61
1/29/2020	10:38	1/29/20 10:38	31.61
1/29/2020	11:44	1/29/20 11:44	31.60
1/29/2020	12:36	1/29/20 12:36	31.61
1/29/2020	13:42	1/29/20 13:42	31.61
1/29/2020	14:37	1/29/20 14:37	31.61
1/29/2020	15:42	1/29/20 15:42	31.62
1/29/2020	16:16	1/29/20 16:16	31.62
1/30/2020	8:24	1/30/20 8:24	31.65

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

Location/Well ID	MW-82-112
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	36 to 57 ft bgs
Approximate Distance from Testing Well	120 ft

Date	Time	Date and Time	Depth to Water
1/27/2020	14:09	1/27/20 14:09	32.90
1/27/2020	16:29	1/27/20 16:29	32.81
1/28/2020	7:39	1/28/20 7:39	31.84
1/28/2020	8:36	1/28/20 8:36	31.81
1/28/2020	9:42	1/28/20 9:42	31.87
1/28/2020	10:34	1/28/20 10:34	31.87
1/28/2020	11:42	1/28/20 11:42	31.89
1/28/2020	12:33	1/28/20 12:33	31.84
1/28/2020	13:41	1/28/20 13:41	31.82
1/28/2020	14:34	1/28/20 14:34	31.74
1/28/2020	15:42	1/28/20 15:42	31.66
1/28/2020	16:14	1/28/20 16:14	31.73
1/29/2020	7:36	1/29/20 7:36	31.66
1/29/2020	8:34	1/29/20 8:34	31.66
1/29/2020	9:43	1/29/20 9:43	31.72
1/29/2020	10:38	1/29/20 10:38	31.76
1/29/2020	11:43	1/29/20 11:43	31.82
1/29/2020	12:35	1/29/20 12:35	31.89
1/29/2020	13:43	1/29/20 13:43	31.91
1/29/2020	14:36	1/29/20 14:36	31.98
1/29/2020	15:43	1/29/20 15:43	32.10
1/29/2020	16:15	1/29/20 16:15	32.07
1/30/2020	8:25	1/30/20 8:25	32.03

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	**MW-82-168**
Well Being Tested	**IRZ-17**
Screened Interval of Well Being Tested	**36 to 57 ft bgs**
Approximate Distance from Testing Well	**120 ft**

Date	Time	Date and Time	Depth to Water
1/27/2020	14:10	1/27/20 14:10	32.26
1/27/2020	16:26	1/27/20 16:26	32.78
1/28/2020	7:41	1/28/20 7:41	31.71
1/28/2020	8:35	1/28/20 8:35	31.52
1/28/2020	9:43	1/28/20 9:43	31.64
1/28/2020	10:33	1/28/20 10:33	31.42
1/28/2020	11:43	1/28/20 11:43	31.37
1/28/2020	12:32	1/28/20 12:32	31.10
1/28/2020	13:42	1/28/20 13:42	31.08
1/28/2020	14:33	1/28/20 14:33	30.80
1/28/2020	15:43	1/28/20 15:43	30.70
1/28/2020	16:11	1/28/20 16:11	31.46
1/29/2020	7:37	1/29/20 7:37	31.54
1/29/2020	8:33	1/29/20 8:33	31.56
1/29/2020	9:44	1/29/20 9:44	31.62
1/29/2020	10:33	1/29/20 10:33	31.66
1/29/2020	11:45	1/29/20 11:45	31.72
1/29/2020	12:34	1/29/20 12:34	31.78
1/29/2020	13:44	1/29/20 13:44	31.82
1/29/2020	14:35	1/29/20 14:35	32.11
1/29/2020	15:45	1/29/20 15:45	32.38
1/29/2020	16:13	1/29/20 16:13	32.08
1/30/2020	8:26	1/30/20 8:26	31.92

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	MW-82-198
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	36 to 57 ft bgs
Approximate Distance from Testing Well	120 ft

Date	Time	Date and Time	Depth to Water
1/27/2020	14:13	1/27/20 14:13	32.53
1/27/2020	16:25	1/27/20 16:25	32.51
1/28/2020	7:42	1/28/20 7:42	31.45
1/28/2020	8:34	1/28/20 8:34	31.32
1/28/2020	9:44	1/28/20 9:44	31.44
1/28/2020	10:32	1/28/20 10:32	31.29
1/28/2020	11:43	1/28/20 11:43	31.21
1/28/2020	12:31	1/28/20 12:31	30.99
1/28/2020	13:43	1/28/20 13:43	30.97
1/28/2020	14:33	1/28/20 14:33	30.73
1/28/2020	15:44	1/28/20 15:44	30.63
1/28/2020	16:12	1/28/20 16:12	31.17
1/29/2020	7:38	1/29/20 7:38	31.28
1/29/2020	8:32	1/29/20 8:32	31.32
1/29/2020	9:45	1/29/20 9:45	31.36
1/29/2020	10:31	1/29/20 10:31	31.40
1/29/2020	11:46	1/29/20 11:46	31.46
1/29/2020	12:33	1/29/20 12:33	31.51
1/29/2020	13:45	1/29/20 13:45	31.54
1/29/2020	14:34	1/29/20 14:34	31.93
1/29/2020	15:46	1/29/20 15:46	32.21
1/29/2020	16:12	1/29/20 16:12	31.86
1/30/2020	8:27	1/30/20 8:27	31.64

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

MW-31-060 During IRZ-17 Upper Screen (36 to 57 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-17: ~136 Feet
Legend
Transducer
Manual
Depth to Water (feet)
41.7
41.8
41.9
42.0
42.1
42.2
42.3
42.4
42.5
42.6
42.7
1/29/20 6:00
1/29/20 9:00
1/29/20 12:00
1/29/20 15:00
1/29/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 919.33 gal
Avg. Flow Rate: 7.65 gpm
Change in Water Level in IRZ-17: 0.44 ft
Specific Capacity: 17.39 gpm/ft
Step 2:
Total Volume Pumped: 1811.87 gal
Avg. Flow Rate: 15.06 gpm
Change in Water Level in IRZ-17: 0.84 ft
Specific Capacity: 17.93 gpm/ft
Step 3:
Total Volume Pumped: 2714.10 gal
Avg. Flow Rate: 22.65 gpm
Change in Water Level in IRZ-17: 1.32 ft
Specific Capacity: 17.16 gpm/ft
Step 4:
Total Volume Pumped: 3618.39 gal
Avg. Flow Rate: 30.12 gpm
Change in Water Level in IRZ-17: 1.68 ft
Specific Capacity: 17.93 gpm/ft

MW-31-135 During IRZ-17 Upper Screen (36 to 57 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-17: ~173 Feet
Legend
Transducer
Manual
Deep screen at RB-3 was pumped from 14:52 to 14:32 at 100 gpm
Deep screen at RB-3 was pumped from 14:05 to 14:21 at 100 gpm
Transducer manually adjusted
Step 1:
Total Volume Pumped: 919.33 gal
Avg. Flow Rate: 7.65 gpm
Change in Water Level in IRZ-17: 0.44 ft
Specific Capacity: 17.39 gpm/ft
Step 2:
Total Volume Pumped: 1811.87 gal
Avg. Flow Rate: 15.06 gpm
Change in Water Level in IRZ-17: 0.84 ft
Specific Capacity: 17.93 gpm/ft
Step 3:
Total Volume Pumped: 2714.10 gal
Avg. Flow Rate: 22.65 gpm
Change in Water Level in IRZ-17: 1.32 ft
Specific Capacity: 17.16 gpm/ft
Step 4:
Total Volume Pumped: 3618.39 gal
Avg. Flow Rate: 30.12 gpm
Change in Water Level in IRZ-17: 1.68 ft
Specific Capacity: 17.93 gpm/ft
Depth to Water (feet)
42.5
43.0
43.5
44.0
44.5
45.0
1/29/20 6:00
1/29/20 9:00
1/29/20 12:00
1/29/20 15:00
1/29/20 18:00
Date and Time

MW-77-046R During IRZ-17 Upper Screen (36 to 57 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-17: ~103 Feet
Legend
Transducer
Manual
Depth to Water (feet)
25.6
25.8
26.0
26.2
26.4
26.6
26.8
27.0
1/29/20 6:00
1/29/20 9:00
1/29/20 12:00
1/29/20 15:00
1/29/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 919.33 gal
Avg. Flow Rate: 7.65 gpm
Change in Water Level in IRZ-17: 0.44 ft
Specific Capacity: 17.39 gpm/ft
Step 2:
Total Volume Pumped: 1811.87 gal
Avg. Flow Rate: 15.06 gpm
Change in Water Level in IRZ-17: 0.84 ft
Specific Capacity: 17.93 gpm/ft
Step 3:
Total Volume Pumped: 2714.10 gal
Avg. Flow Rate: 22.65 gpm
Change in Water Level in IRZ-17: 1.32 ft
Specific Capacity: 17.16 gpm/ft
Step 4:
Total Volume Pumped: 3618.39 gal
Avg. Flow Rate: 30.12 gpm
Change in Water Level in IRZ-17: 1.68 ft
Specific Capacity: 17.93 gpm/ft

MW-77-102 During IRZ-17 Upper Screen (36 to 57 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Transducer was not used
Distance to IRZ-17: ~113 Feet
Legend
Manual
Deep screen at RB-3 was pumped from 14:52 to 14:32 at 100 gpm
Deep screen at RB-3 was pumped from 14:05 to 14:21 at 100 gpm
Step 1:
Total Volume Pumped: 919.33 gal
Avg. Flow Rate: 7.65 gpm
Change in Water Level in IRZ-17: 0.44 ft
Specific Capacity: 17.39 gpm/ft
Step 2:
Total Volume Pumped: 1811.87 gal
Avg. Flow Rate: 15.06 gpm
Change in Water Level in IRZ-17: 0.84 ft
Specific Capacity: 17.93 gpm/ft
Step 3:
Total Volume Pumped: 2714.10 gal
Avg. Flow Rate: 22.65 gpm
Change in Water Level in IRZ-17: 1.32 ft
Specific Capacity: 17.16 gpm/ft
Step 4:
Total Volume Pumped: 3618.39 gal
Avg. Flow Rate: 30.12 gpm
Change in Water Level in IRZ-17: 1.68 ft
Specific Capacity: 17.93 gpm/ft
Depth to Water (feet)
26.2
26.3
26.4
26.5
26.6
26.7
26.8
26.9
27.0
1/29/20 6:00
1/29/20 9:00
1/29/20 12:00
1/29/20 15:00
1/29/20 18:00
Date and Time

MW-77-158 During IRZ-17 Upper Screen (36 to 57 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-17: ~108 Feet
Legend
Transducer
Manual
Deep screen at RB-3 was pumped from 14:52 to 14:32 at 100 gpm
Deep screen at RB-3 was pumped from 14:05 to 14:21 at 100 gpm
Depth to Water (feet)
26.2
26.7
27.2
27.7
28.2
28.7
Step 1:
Total Volume Pumped: 919.33 gal
Avg. Flow Rate: 7.65 gpm
Change in Water Level in IRZ-17: 0.44 ft
Specific Capacity: 17.39 gpm/ft
Step 2:
Total Volume Pumped: 1811.87 gal
Avg. Flow Rate: 15.06 gpm
Change in Water Level in IRZ-17: 0.84 ft
Specific Capacity: 17.93 gpm/ft
Step 3:
Total Volume Pumped: 2714.10 gal
Avg. Flow Rate: 22.65 gpm
Change in Water Level in IRZ-17: 1.32 ft
Specific Capacity: 17.16 gpm/ft
Step 4:
Total Volume Pumped: 3618.39 gal
Avg. Flow Rate: 30.12 gpm
Change in Water Level in IRZ-17: 1.68 ft
Specific Capacity: 17.93 gpm/ft
1/29/20 6:00
1/29/20 9:00
1/29/20 12:00
1/29/20 15:00
1/29/20 18:00
Date and Time

MW-77-187 During IRZ-17 Upper Screen (36 to 57 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Transducer was not used
Distance to IRZ-17: ~108 Feet
Legend
Manual
Deep screen at RB-3 was pumped from 14:52 to 14:32 at 100 gpm
Deep screen at RB-3 was pumped from 14:05 to 14:21 at 100 gpm
Depth to Water (feet)
26.2
26.4
26.6
26.8
27.0
27.2
27.4
27.6
27.8
Step 1:
Total Volume Pumped: 919.33 gal
Avg. Flow Rate: 7.65 gpm
Change in Water Level in IRZ-17: 0.44 ft
Specific Capacity: 17.39 gpm/ft
Step 2:
Total Volume Pumped: 1811.87 gal
Avg. Flow Rate: 15.06 gpm
Change in Water Level in IRZ-17: 0.84 ft
Specific Capacity: 17.93 gpm/ft
Step 3:
Total Volume Pumped: 2714.10 gal
Avg. Flow Rate: 22.65 gpm
Change in Water Level in IRZ-17: 1.32 ft
Specific Capacity: 17.16 gpm/ft
Step 4:
Total Volume Pumped: 3618.39 gal
Avg. Flow Rate: 30.12 gpm
Change in Water Level in IRZ-17: 1.68 ft
Specific Capacity: 17.93 gpm/ft
1/29/20 6:00
1/29/20 9:00
1/29/20 12:00
1/29/20 15:00
1/29/20 18:00
Date and Time

MW-82-046 During IRZ-17 Upper Screen (36 to 57 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-17: ~120 Feet
Legend
Transducer
Manual
Depth to Water (feet)
31.0
31.2
31.4
31.6
31.8
32.0
32.2
32.4
1/29/20 6:00
1/29/20 9:00
1/29/20 12:00
1/29/20 15:00
1/29/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 919.33 gal
Avg. Flow Rate: 7.65 gpm
Change in Water Level in IRZ-17: 0.44 ft
Specific Capacity: 17.39 gpm/ft
Step 2:
Total Volume Pumped: 1811.87 gal
Avg. Flow Rate: 15.06 gpm
Change in Water Level in IRZ-17: 0.84 ft
Specific Capacity: 17.93 gpm/ft
Step 3:
Total Volume Pumped: 2714.10 gal
Avg. Flow Rate: 22.65 gpm
Change in Water Level in IRZ-17: 1.32 ft
Specific Capacity: 17.16 gpm/ft
Step 4:
Total Volume Pumped: 3618.39 gal
Avg. Flow Rate: 30.12 gpm
Change in Water Level in IRZ-17: 1.68 ft
Specific Capacity: 17.93 gpm/ft

MW-82-112 During IRZ-17 Upper Screen (36 to 57 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Transducer was not used
Distance to IRZ-17: ~120 Feet
Legend
Manual
Deep screen at RB-3 was pumped from 14:05 to 14:21 at 100 gpm
Deep screen at RB-3 was pumped from 14:52 to 14:32 at 100 gpm
Step 1:
Total Volume Pumped: 919.33 gal
Avg. Flow Rate: 7.65 gpm
Change in Water Level in IRZ-17: 0.44 ft
Specific Capacity: 17.39 gpm/ft
Step 2:
Total Volume Pumped: 1811.87 gal
Avg. Flow Rate: 15.06 gpm
Change in Water Level in IRZ-17: 0.84 ft
Specific Capacity: 17.93 gpm/ft
Step 3:
Total Volume Pumped: 2714.10 gal
Avg. Flow Rate: 22.65 gpm
Change in Water Level in IRZ-17: 1.32 ft
Specific Capacity: 17.16 gpm/ft
Step 4:
Total Volume Pumped: 3618.39 gal
Avg. Flow Rate: 30.12 gpm
Change in Water Level in IRZ-17: 1.68 ft
Specific Capacity: 17.93 gpm/ft
Depth to Water (feet)
31.6
31.7
31.8
31.9
32.0
32.1
32.2
32.3
1/29/20 6:00
1/29/20 9:00
1/29/20 12:00
1/29/20 15:00
1/29/20 18:00
Date and Time

MW-82-168 During IRZ-17 Upper Screen (36 to 57 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-17: ~120 Feet
Legend
Transducer
Manual
Deep screen at RB-3 was pumped from 14:52 to 14:32 at 100 gpm
Deep screen at RB-3 was pumped from 14:05 to 14:21 at 100 gpm
Depth to Water (feet)
31.0
31.5
32.0
32.5
33.0
33.5
34.0
1/29/20 6:00
1/29/20 9:00
1/29/20 12:00
1/29/20 15:00
1/29/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 919.33 gal
Avg. Flow Rate: 7.65 gpm
Change in Water Level in IRZ-17: 0.44 ft
Specific Capacity: 17.39 gpm/ft
Step 2:
Total Volume Pumped: 1811.87 gal
Avg. Flow Rate: 15.06 gpm
Change in Water Level in IRZ-17: 0.84 ft
Specific Capacity: 17.93 gpm/ft
Step 3:
Total Volume Pumped: 2714.10 gal
Avg. Flow Rate: 22.65 gpm
Change in Water Level in IRZ-17: 1.32 ft
Specific Capacity: 17.16 gpm/ft
Step 4:
Total Volume Pumped: 3618.39 gal
Avg. Flow Rate: 30.12 gpm
Change in Water Level in IRZ-17: 1.68 ft
Specific Capacity: 17.93 gpm/ft

MW-82-198 During IRZ-17 Upper Screen (36 to 57 ft) Injectivity Test
Step 1
Step 2
Step 3
Step 4
Transducer was not used
Distance to IRZ-17: ~120 Feet
Legend
Manual
Deep screen at RB-3 was pumped from 14:52 to 14:32 at 100 gpm
Deep screen at RB-3 was pumped from 14:05 to 14:21 at 100 gpm
Step 1:
Total Volume Pumped: 919.33 gal
Avg. Flow Rate: 7.65 gpm
Change in Water Level in IRZ-17: 0.44 ft
Specific Capacity: 17.39 gpm/ft
Step 2:
Total Volume Pumped: 1811.87 gal
Avg. Flow Rate: 15.06 gpm
Change in Water Level in IRZ-17: 0.84 ft
Specific Capacity: 17.93 gpm/ft
Step 3:
Total Volume Pumped: 2714.10 gal
Avg. Flow Rate: 22.65 gpm
Change in Water Level in IRZ-17: 1.32 ft
Specific Capacity: 17.16 gpm/ft
Step 4:
Total Volume Pumped: 3618.39 gal
Avg. Flow Rate: 30.12 gpm
Change in Water Level in IRZ-17: 1.68 ft
Specific Capacity: 17.93 gpm/ft
Depth to Water (feet)
30.5
31.0
31.5
32.0
32.5
33.0
1/29/20 6:00
1/29/20 9:00
1/29/20 12:00
1/29/20 15:00
1/29/20 18:00
Date and Time

Specific Capacity Testing

Location/Well ID	**IRZ-17**
Date	**1/26/2020**
Screened Interval Tested	**Upper (36 to 57 ft bgs)**
Packer Set Depth	**91 to 95 ft btoc**
Packer Seal Test	Confirmed packer to be watertight before test
Tests Conducted	Four-step specific capacity test (7.6, 14.9, 22.7, 30.2)
Purpose	Well performance test
Summary	Specific capacity: 15.55 to 18.43 gpm/ft
Notes	Inconsistant pumping rate at start of Step 1
	Possible water level malfunction used in MW-82 monitoring point cluster
Oversight Signature	
Date	2/24/2020

Acronyms & Abbreviations
bgs = below ground surface
btoc = below top of casing
ft = feet
gpm = gallons per minute

Specific Capacity Test

Location/Well ID	IRZ-17 (Lower)
Date	1/26/2020
Screened Interval	36 - 57 ft bgs
Pump Depth (ft btoc)	52.00
Packer Depth (ft btoc)	91.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 137 to 167 ft btoc	27.78
Initial Water Level Within 36 to 57 ft btoc	27.87
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	9060.61
Approx Pumped Volume (gal)	9060.61
Calculated Volume Purged (gal)	9056.75
Difference in Volume Pumped vs. Calculated	5.43
Number of Specific Capacity Steps	4
Pumping Rates (in order)	7.6, 14.9, 22.7, 30.2 gpm

Step 1 - Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time (min)	Pumping Rate (gpm)	Total Volume pumped (gal)	Depth to Water (ft)	Drawdown (ft)
8:00:00	0	0	0.00	0.00	27.78	-0.09
8:00:20	0.3	0.33	8.95	2.98	28.12	0.25
8:00:40	0.3	0.67	6.18	5.04	28.10	0.23
8:01:00	0.3	1.00	7.80	7.64	28.13	0.26
8:02:00	1.0	2.00	7.56	15.20	28.15	0.28
8:03:00	1.0	3.00	7.56	22.76	28.16	0.29
8:04:00	1.0	4.00	7.54	30.30	28.17	0.30
8:05:00	1.0	5.00	7.52	37.82	28.17	0.30
8:06:00	1.0	6.00	7.48	45.30	28.19	0.32
8:07:00	1.0	7.00	7.48	52.78	28.19	0.32
8:08:00	1.0	8.00	7.91	60.69	28.20	0.33
8:09:00	1.0	9.00	7.67	68.36	28.20	0.33
8:10:00	1.0	10.00	7.50	75.86	28.20	0.33
8:12:00	2.0	12.00	7.60	91.06	28.20	0.33
8:14:00	2.0	14.00	7.50	106.06	28.20	0.33
8:16:00	2.0	16.00	7.54	121.14	28.20	0.33
8:18:00	2.0	18.00	7.50	136.14	28.20	0.33
8:20:00	2.0	20.00	7.52	151.18	28.20	0.33
8:22:00	2.0	22.00	7.52	166.22	28.21	0.34
8:24:00	2.0	24.00	7.52	181.26	28.21	0.34
8:26:00	2.0	26.00	7.52	196.30	28.22	0.35
8:28:00	2.0	28.00	7.50	211.30	28.22	0.35
8:30:00	2.0	30.00	7.56	226.42	28.22	0.35
8:35:00	5.0	35.00	7.54	264.12	28.22	0.35
8:40:00	5.0	40.00	7.54	301.82	28.22	0.35
8:45:00	5.0	45.00	7.54	339.52	28.22	0.35
8:50:00	5.0	50.00	7.54	377.22	28.23	0.36
8:55:00	5.0	55.00	7.54	414.92	28.24	0.37
9:00:00	5.0	60.00	7.54	452.62	28.23	0.36
9:10:00	10.0	70.00	7.54	528.02	28.24	0.37
9:20:00	10.0	80.00	7.54	603.42	28.24	0.37
9:30:00	10.0	90.00	7.54	678.82	28.25	0.38
9:40:00	10.0	100.00	7.54	754.22	28.26	0.39
9:50:00	10.0	110.00	7.54	829.62	28.27	0.40
10:00:00	10.0	120.00	7.54	905.02	28.28	0.41

Total Volume Pumped for Step 1 (gal)	**905.02**
Average Pumping Rate (gpm)	**7.56**
Specific Capacity (gpm/ft)	**18.43**

Specific Capacity Test

Location/Well ID	IRZ-17 (Lower)
Date	1/26/2020
Screened Interval	36 - 57 ft bgs
Pump Depth (ft btoc)	52.00
Packer Depth (ft btoc)	91.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 137 to 167 ft btoc	27.78
Initial Water Level Within 36 to 57 ft btoc	27.87
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	9060.61
Approx Pumped Volume (gal)	9060.61
Calculated Volume Purged (gal)	9056.75
Difference in Volume Pumped vs. Calculated	5.43
Number of Specific Capacity Steps	4
Pumping Rates (in order)	7.6, 14.9, 22.7, 30.2 gpm

Step 2 - Time (HR:MN:SEC)	Change in Time Between measurements (min)	Elapsed Time from Test Start (min)	Pumping Rate (gpm)	Total Volume Pumped (gal)	Depth to Water (ft)	Drawdown (ft)	Elapsed Time from Step 2 Start (min)
10:00:20	0.3	120.33	8.82	907.96	28.34	0.47	0.33
10:00:40	0.3	120.67	15.51	913.13	28.57	0.70	0.67
10:01:00	0.3	121.00	15.21	918.20	28.62	0.75	1.00
10:02:00	1.0	122.00	15.16	933.36	28.65	0.78	2.00
10:03:00	1.0	123.00	15.16	948.52	28.67	0.80	3.00
10:04:00	1.0	124.00	15.08	963.60	28.68	0.81	4.00
10:05:00	1.0	125.00	15.10	978.70	28.68	0.81	5.00
10:06:00	1.0	126.00	15.06	993.76	28.69	0.82	6.00
10:07:00	1.0	127.00	15.04	1008.80	28.70	0.83	7.00
10:08:00	1.0	128.00	15.04	1023.84	28.70	0.83	8.00
10:09:00	1.0	129.00	15.01	1038.85	28.70	0.83	9.00
10:10:00	1.0	130.00	15.10	1053.95	28.70	0.83	10.00
10:12:00	2.0	132.00	15.08	1084.11	28.71	0.84	12.00
10:14:00	2.0	134.00	15.06	1114.23	28.72	0.85	14.00
10:16:00	2.0	136.00	15.01	1144.25	28.72	0.85	16.00
10:18:00	2.0	138.00	14.99	1174.23	28.72	0.85	18.00
10:20:00	2.0	140.00	15.12	1204.47	28.73	0.86	20.00
10:22:00	2.0	142.00	15.10	1234.67	28.73	0.86	22.00
10:24:00	2.0	144.00	15.10	1264.87	28.73	0.86	24.00
10:26:00	2.0	146.00	15.08	1295.03	28.73	0.86	26.00
10:28:00	2.0	148.00	15.08	1325.19	28.73	0.86	28.00
10:30:00	2.0	150.00	15.08	1355.35	28.73	0.86	30.00
10:35:00	5.0	155.00	15.08	1430.75	28.73	0.86	35.00
10:40:00	5.0	160.00	15.00	1505.75	28.73	0.86	40.00
10:45:00	5.0	165.00	15.04	1580.95	28.73	0.86	45.00
10:50:00	5.0	170.00	15.04	1656.15	28.74	0.87	50.00
10:55:00	5.0	175.00	15.16	1731.95	28.75	0.88	55.00
11:00:00	5.0	180.00	15.10	1807.45	28.75	0.88	60.00
11:10:00	10.0	190.00	15.10	1958.45	28.74	0.87	70.00
11:20:00	10.0	200.00	15.04	2108.85	28.75	0.88	80.00
11:30:00	10.0	210.00	15.01	2258.95	28.76	0.89	90.00
11:40:00	10.0	220.00	14.94	2408.35	28.75	0.88	100.00
11:50:00	10.0	230.00	15.08	2559.15	28.75	0.88	110.00
12:00:00	10.0	240.00	15.08	2709.95	27.76	-0.11	120.00

Total Volume Pumped for Step 2 (gal)	1804.93
Average Pumping Rate (gpm)	14.90
Specific Capacity (gpm/ft)	16.93

Specific Capacity Test

Location/Well ID	IRZ-17 (Lower)
Date	1/26/2020
Screened Interval	36 - 57 ft bgs
Pump Depth (ft btoc)	52.00
Packer Depth (ft btoc)	91.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 137 to 167 ft btoc	27.78
Initial Water Level Within 36 to 57 ft btoc	27.87
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	9060.61
Approx Pumped Volume (gal)	9060.61
Calculated Volume Purged (gal)	9056.75
Difference in Volume Pumped vs. Calculated	5.43
Number of Specific Capacity Steps	4
Pumping Rates (in order)	7.6, 14.9, 22.7, 30.2 gpm

Step 3 - Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time from Test Start (min)	Pumping Rate (gpm)	Total Volume Pumped (Gallons)	Depth to Water (ft)	Drawdown (ft)	Elapsed Time from Step 3 Start (min)
12:00:20	0.3	240.33	21.54	2717.13	29.00	1.13	0.33
12:00:40	0.3	240.67	22.34	2724.58	29.09	1.22	0.67
12:01:00	0.3	241.00	22.74	2732.16	29.12	1.25	1.00
12:02:00	1.0	242.00	22.77	2754.93	29.15	1.28	2.00
12:03:00	1.0	243.00	22.77	2777.70	29.16	1.29	3.00
12:04:00	1.0	244.00	22.79	2800.49	29.17	1.30	4.00
12:05:00	1.0	245.00	22.74	2823.23	29.18	1.31	5.00
12:06:00	1.0	246.00	22.74	2845.97	29.20	1.33	6.00
12:07:00	1.0	247.00	22.77	2868.74	29.20	1.33	7.00
12:08:00	1.0	248.00	22.74	2891.48	29.20	1.33	8.00
12:09:00	1.0	249.00	22.77	2914.25	29.21	1.34	9.00
12:10:00	1.0	250.00	22.74	2936.99	29.21	1.34	10.00
12:12:00	2.0	252.00	22.74	2982.47	29.21	1.34	12.00
12:14:00	2.0	254.00	22.74	3027.95	29.21	1.34	14.00
12:16:00	2.0	256.00	22.74	3073.43	29.21	1.34	16.00
12:18:00	2.0	258.00	22.74	3118.91	29.21	1.34	18.00
12:20:00	2.0	260.00	22.74	3164.39	29.22	1.35	20.00
12:22:00	2.0	262.00	22.72	3209.83	29.22	1.35	22.00
12:24:00	2.0	264.00	22.74	3255.31	29.23	1.36	24.00
12:26:00	2.0	266.00	22.74	3300.79	29.23	1.36	26.00
12:28:00	2.0	268.00	22.74	3346.27	29.23	1.36	28.00
12:30:00	2.0	270.00	22.74	3391.75	29.23	1.36	30.00
12:35:00	5.0	275.00	22.72	3505.35	29.24	1.37	35.00
12:40:00	5.0	280.00	22.72	3618.95	29.24	1.37	40.00
12:45:00	5.0	285.00	22.72	3732.55	29.25	1.38	45.00
12:50:00	5.0	290.00	22.72	3846.15	29.25	1.38	50.00
12:55:00	5.0	295.00	22.72	3959.75	29.25	1.38	55.00
13:00:00	5.0	300.00	22.72	4073.35	29.25	1.38	60.00
13:10:00	10.0	310.00	22.70	4300.35	29.26	1.39	70.00
13:20:00	10.0	320.00	22.70	4527.35	29.26	1.39	80.00
13:30:00	10.0	330.00	22.72	4754.55	29.26	1.39	90.00
13:40:00	10.0	340.00	22.72	4981.75	29.27	1.40	100.00
13:50:00	10.0	350.00	22.72	5208.95	29.27	1.40	110.00
14:00:00	10.0	360.00	22.72	5436.15	29.28	1.41	120.00

Total Volume Pumped for Step 3 (gal)	2726.20
Average Pumping Rate (gpm)	22.69
Specific Capacity (gpm/ft)	16.09

Specific Capacity Test

Location/Well ID	IRZ-17 (Lower)
Date	1/26/2020
Screened Interval	36 - 57 ft bgs
Pump Depth (ft btoc)	52.00
Packer Depth (ft btoc)	91.00
Packer Leak Test (Pass/Fail)	Pass
Initial Water Level Within 137 to 167 ft btoc	27.78
Initial Water Level Within 36 to 57 ft btoc	27.87
Initial Totalizer Reading (gal)	0.00
Final Totalizer Reading (gal)	9060.61
Approx Pumped Volume (gal)	9060.61
Calculated Volume Purged (gal)	9056.75
Difference in Volume Pumped vs. Calculated	5.43
Number of Specific Capacity Steps	4
Pumping Rates (in order)	7.6, 14.9, 22.7, 30.2 gpm

Step 4 - Time (HR:MN:SEC)	Change in Time Between Measurements (min)	Elapsed Time from Test Start (min)	Pumping Rate (gpm)	Total Volume Pumped (Gallons)	Depth to Water (ft)	Drawdown (ft)	Elapsed Time from Step 4 Start (min)
14:00:20	0.3	360.33	28.91	5445.79	29.52	1.65	0.33
14:00:40	0.3	360.67	30.00	5455.79	29.62	1.75	0.33
14:01:00	0.3	361.00	30.16	5465.84	29.65	1.78	0.67
14:02:00	1.0	362.00	30.22	5496.06	29.69	1.82	1.67
14:03:00	1.0	363.00	30.20	5526.26	29.70	1.83	2.67
14:04:00	1.0	364.00	30.20	5556.46	29.71	1.84	3.67
14:05:00	1.0	365.00	30.20	5586.66	29.72	1.85	4.67
14:06:00	1.0	366.00	30.20	5616.86	29.72	1.85	5.67
14:07:00	1.0	367.00	30.22	5647.08	29.73	1.86	6.67
14:08:00	1.0	368.00	30.22	5677.30	29.73	1.86	7.67
14:09:00	1.0	369.00	30.22	5707.52	29.73	1.86	8.67
14:10:00	1.0	370.00	30.20	5737.72	29.73	1.86	9.67
14:12:00	2.0	372.00	30.22	5798.16	29.74	1.87	11.67
14:14:00	2.0	374.00	30.22	5858.60	29.76	1.89	13.67
14:16:00	2.0	376.00	30.20	5919.00	29.76	1.89	15.67
14:18:00	2.0	378.00	30.20	5979.40	29.78	1.91	17.67
14:20:00	2.0	380.00	30.22	6039.84	29.78	1.91	19.67
14:22:00	2.0	382.00	30.22	6100.28	29.77	1.90	21.67
14:24:00	2.0	384.00	30.18	6160.64	29.77	1.90	23.67
14:26:00	2.0	386.00	30.20	6221.04	29.77	1.90	25.67
14:28:00	2.0	388.00	30.20	6281.44	29.78	1.91	27.67
14:30:00	2.0	390.00	30.18	6341.80	29.78	1.91	29.67
14:35:00	5.0	395.00	30.22	6492.90	29.77	1.90	34.67
14:40:00	5.0	400.00	30.20	6643.90	29.76	1.89	39.67
14:45:00	5.0	405.00	30.24	6795.10	29.76	1.89	44.67
14:50:00	5.0	410.00	30.24	6946.30	29.76	1.89	49.67
14:55:00	5.0	415.00	30.22	7097.40	29.77	1.90	54.67
15:00:00	5.0	420.00	30.22	7248.50	29.78	1.91	59.67
15:10:00	10.0	430.00	30.22	7550.70	29.78	1.91	69.67
15:20:00	10.0	440.00	30.22	7852.90	29.78	1.91	79.67
15:30:00	10.0	450.00	30.22	8155.10	29.79	1.92	89.67
15:40:00	10.0	460.00	30.22	8457.30	29.80	1.93	99.67
15:50:00	10.0	470.00	30.24	8759.70	29.80	1.93	109.67
16:00:00	10.0	480.00	30.22	9061.90	29.81	1.94	119.67
16:01:00	1.0	481.00	0.00	9061.90	28.30	0.43	120.67
16:02:00	1.0	482.00	0.00	9061.90	28.21	0.34	121.67
16:03:00	1.0	483.00	0.00	9061.90	28.20	0.33	122.67
16:04:00	1.0	484.00	0.00	9061.90	28.16	0.29	123.67
16:05:00	1.0	485.00	0.00	9061.90	28.14	0.27	124.67
16:06:00	1.0	486.00	0.00	9061.90	28.12	0.25	125.67
16:07:00	1.0	487.00	0.00	9061.90	28.10	0.23	126.67
16:08:00	1.0	488.00	0.00	9061.90	28.09	0.22	127.67
16:09:00	1.0	489.00	0.00	9061.90	28.09	0.22	128.67
16:10:00	1.0	490.00	0.00	9061.90	28.09	0.22	129.67
Total Volume Pumped for Step 4 (gal)			**3625.75**				
Average Pumping Rate (gpm)			**30.17**				
Specific Capacity (gpm/ft)			**15.55**				

Acronyms & Abbreviations
bgs = below ground surface
btoc = below top of casing
ft = feet
gal = gallons
gpm = gallons per minute
min = minutes

IRZ-17 Upper Screen (36 to 57 ft) Linear Drawdown Plot
Drawdown (feet)
Elapsed Time (min)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
0
100
200
300
400
500
600
700
Step 1:
Total Volume Pumped: 905.02 gal
Avg. Flow Rate: 7.56 gpm
Drawdown: 0.41 ft
Specific Capacity: 18.43 gpm/ft
Step 2:
Total Volume Pumped: 1804.93 gal
Avg. Flow Rate: 14.90 gpm
Drawdown: 0.88 ft
Specific Capacity: 16.93 gpm/ft
Step 3:
Total Volume Pumped: 2726.20 gal
Avg. Flow Rate: 22.69 gpm
Drawdown: 1.41 ft
Specific Capacity: 16.09 gpm/ft
Step 4:
Total Volume Pumped: 3625.75 gal
Avg. Flow Rate: 30.17 gpm
Drawdown: 1.94 ft
Specific Capacity: 15.55 gpm/ft
Inconsistent Pumping Rate
Recovery
Legend
Transducer
Manual

IRZ-17 Upper Screen (36 to 57 ft) Semi-Log Drawdown Plot

Specific Capacity/
Injection Test Monitoring Point

Location/Well ID	MW-31-060
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	36 to 57 ft bgs
Approximate Distance from Testing Well	136 ft

Date	Time	Date and Time	Depth to Water
1/24/2020	16:27	1/24/20 16:27	42.64
1/25/2020	7:34	1/25/20 7:34	42.64
1/25/2020	8:37	1/25/20 8:37	42.66
1/25/2020	9:48	1/25/20 9:48	42.63
1/25/2020	10:36	1/25/20 10:36	42.65
1/25/2020	11:48	1/25/20 11:48	42.62
1/25/2020	12:37	1/25/20 12:37	42.63
1/25/2020	13:48	1/25/20 13:48	42.64
1/25/2020	14:37	1/25/20 14:37	42.65
1/25/2020	15:39	1/25/20 15:39	42.68
1/25/2020	16:20	1/25/20 16:20	42.67
1/26/2020	7:19	1/26/20 7:19	42.59
1/26/2020	8:38	1/26/20 8:38	42.62
1/26/2020	9:49	1/26/20 9:49	42.64
1/26/2020	10:38	1/26/20 10:38	42.68
1/26/2020	11:52	1/26/20 11:52	42.68
1/26/2020	12:38	1/26/20 12:38	42.71
1/26/2020	13:46	1/26/20 13:46	42.75
1/26/2020	14:39	1/26/20 14:39	42.80
1/26/2020	15:41	1/26/20 15:41	42.83
1/26/2020	16:21	1/26/20 16:21	42.74
1/27/2020	8:31	1/27/20 8:31	42.97

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	MW-31-135
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	36 to 57 ft bgs
Approximate Distance from Testing Well	173 ft

Date	Time	Date and Time	Depth to Water
1/24/2020	16:20	1/24/20 16:20	44.08
1/25/2020	7:32	1/25/20 7:32	44.05
1/25/2020	8:39	1/25/20 8:39	44.09
1/25/2020	9:47	1/25/20 9:47	44.09
1/25/2020	10:37	1/25/20 10:37	44.13
1/25/2020	11:46	1/25/20 11:46	44.13
1/25/2020	12:38	1/25/20 12:38	44.16
1/25/2020	13:47	1/25/20 13:47	44.16
1/25/2020	14:38	1/25/20 14:38	44.21
1/25/2020	15:38	1/25/20 15:38	44.23
1/25/2020	16:21	1/25/20 16:21	44.12
1/26/2020	7:21	1/26/20 7:21	44.01
1/26/2020	8:37	1/26/20 8:37	44.04
1/26/2020	9:50	1/26/20 9:50	44.06
1/26/2020	10:37	1/26/20 10:37	44.08
1/26/2020	11:52	1/26/20 11:52	44.08
1/26/2020	12:37	1/26/20 12:37	44.10
1/26/2020	13:48	1/26/20 13:48	44.10
1/26/2020	14:37	1/26/20 14:37	44.12
1/26/2020	15:42	1/26/20 15:42	44.12
1/26/2020	16:19	1/26/20 16:19	44.08
1/27/2020	8:33	1/27/20 8:33	43.92

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	MW-77-046R
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	36 to 57 ft bgs
Approximate Distance from Testing Well	103 ft

Date	Time	Date and Time	Depth to Water
1/24/2020	15:46	1/24/20 15:46	26.35
1/25/2020	7:31	1/25/20 7:31	26.33
1/25/2020	8:32	1/25/20 8:32	26.30
1/25/2020	9:40	1/25/20 9:40	26.27
1/25/2020	10:28	1/25/20 10:28	26.27
1/25/2020	11:37	1/25/20 11:37	26.26
1/25/2020	12:32	1/25/20 12:32	26.27
1/25/2020	13:36	1/25/20 13:36	26.27
1/25/2020	14:32	1/25/20 14:32	26.31
1/25/2020	15:30	1/25/20 15:30	26.31
1/25/2020	16:15	1/25/20 16:15	26.31
1/26/2020	7:16	1/26/20 7:16	26.26
1/26/2020	8:35	1/26/20 8:35	26.26
1/26/2020	9:31	1/26/20 9:31	26.27
1/26/2020	10:34	1/26/20 10:34	26.29
1/26/2020	11:21	1/26/20 11:21	26.31
1/26/2020	12:36	1/26/20 12:36	26.34
1/26/2020	13:32	1/26/20 13:32	26.36
1/26/2020	14:35	1/26/20 14:35	26.42
1/26/2020	15:30	1/26/20 15:30	26.47
1/26/2020	16:20	1/26/20 16:20	26.40
1/27/2020	8:10	1/27/20 8:10	26.19

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

Location/Well ID	MW-77-102
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	36 to 57 ft bgs
Approximate Distance from Testing Well	113 ft

Date	Time	Date and Time	Depth to Water
1/24/2020	15:52	1/24/20 15:52	27.00
1/25/2020	7:27	1/25/20 7:27	26.85
1/25/2020	8:36	1/25/20 8:36	26.84
1/25/2020	9:36	1/25/20 9:36	26.86
1/25/2020	10:33	1/25/20 10:33	26.89
1/25/2020	11:33	1/25/20 11:33	26.94
1/25/2020	12:36	1/25/20 12:36	27.00
1/25/2020	13:31	1/25/20 13:31	27.02
1/25/2020	14:37	1/25/20 14:37	27.05
1/25/2020	15:25	1/25/20 15:25	27.04
1/25/2020	16:19	1/25/20 16:19	27.00
1/26/2020	7:20	1/26/20 7:20	26.73
1/26/2020	8:32	1/26/20 8:32	26.80
1/26/2020	9:35	1/26/20 9:35	26.83
1/26/2020	10:31	1/26/20 10:31	26.90
1/26/2020	11:24	1/26/20 11:24	26.90
1/26/2020	12:31	1/26/20 12:31	26.93
1/26/2020	13:35	1/26/20 13:35	26.94
1/26/2020	14:32	1/26/20 14:32	26.97
1/26/2020	15:33	1/26/20 15:33	26.98
1/26/2020	16:17	1/26/20 16:17	26.95
1/27/2020	8:14	1/27/20 8:14	26.62

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

Location/Well ID	MW-77-158
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	36 to 57 ft bgs
Approximate Distance from Testing Well	108 ft

Date	Time	Date and Time	Depth to Water
1/24/2020	15:44	1/24/20 15:44	27.50
1/25/2020	7:28	1/25/20 7:28	27.35
1/25/2020	8:34	1/25/20 8:34	27.63
1/25/2020	9:38	1/25/20 9:38	27.68
1/25/2020	10:32	1/25/20 10:32	28.00
1/25/2020	11:34	1/25/20 11:34	28.02
1/25/2020	12:35	1/25/20 12:35	28.32
1/25/2020	13:33	1/25/20 13:33	28.35
1/25/2020	14:35	1/25/20 14:35	28.70
1/25/2020	15:26	1/25/20 15:26	28.72
1/25/2020	16:17	1/25/20 16:17	28.53
1/26/2020	7:19	1/26/20 7:19	27.25
1/26/2020	8:33	1/26/20 8:33	27.31
1/26/2020	9:33	1/26/20 9:33	27.32
1/26/2020	10:32	1/26/20 10:32	27.38
1/26/2020	11:23	1/26/20 11:23	27.39
1/26/2020	12:32	1/26/20 12:32	27.41
1/26/2020	13:34	1/26/20 13:34	27.41
1/26/2020	14:33	1/26/20 14:33	27.42
1/26/2020	15:32	1/26/20 15:32	27.42
1/26/2020	16:18	1/26/20 16:18	27.42
1/27/2020	8:13	1/27/20 8:13	27.11

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	MW-77-187
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	36 to 57 ft bgs
Approximate Distance from Testing Well	108 ft

Date	Time	Date and Time	Depth to Water
1/24/2020	15:49	1/24/20 15:49	27.22
1/25/2020	7:30	1/25/20 7:30	27.11
1/25/2020	8:33	1/25/20 8:33	27.28
1/25/2020	9:39	1/25/20 9:39	27.34
1/25/2020	10:30	1/25/20 10:30	27.60
1/25/2020	11:36	1/25/20 11:36	27.64
1/25/2020	12:33	1/25/20 12:33	27.84
1/25/2020	13:34	1/25/20 13:34	27.91
1/25/2020	14:33	1/25/20 14:33	28.12
1/25/2020	15:28	1/25/20 15:28	28.15
1/25/2020	16:17	1/25/20 16:17	27.35
1/26/2020	7:18	1/26/20 7:18	27.01
1/26/2020	8:34	1/26/20 8:34	27.06
1/26/2020	9:32	1/26/20 9:32	27.06
1/26/2020	10:33	1/26/20 10:33	27.11
1/26/2020	11:22	1/26/20 11:22	27.11
1/26/2020	12:35	1/26/20 12:35	27.12
1/26/2020	13:33	1/26/20 13:33	27.12
1/26/2020	14:34	1/26/20 14:34	27.12
1/26/2020	15:31	1/26/20 15:31	27.12
1/26/2020	16:31	1/26/20 16:31	27.11
1/27/2020	16:19	1/27/20 16:19	26.90

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	MW-82-046
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	36 to 57 ft bgs
Approximate Distance from Testing Well	120 ft

Date	Time	Date and Time	Depth to Water
1/24/2020	16:04	1/24/20 16:04	31.59
1/25/2020	7:24	1/25/20 7:24	31.75
1/25/2020	8:35	1/25/20 8:35	31.76
1/25/2020	9:41	1/25/20 9:41	31.75
1/25/2020	10:34	1/25/20 10:34	31.75
1/25/2020	11:41	1/25/20 11:41	31.75
1/25/2020	12:35	1/25/20 12:35	31.75
1/25/2020	13:41	1/25/20 13:41	31.76
1/25/2020	14:34	1/25/20 14:34	31.76
1/25/2020	15:33	1/25/20 15:33	31.76
1/25/2020	16:16	1/25/20 16:16	31.76
1/26/2020	7:18	1/26/20 7:18	31.78
1/26/2020	8:31	1/26/20 8:31	31.77
1/26/2020	9:48	1/26/20 9:48	31.77
1/26/2020	10:32	1/26/20 10:32	31.77
1/26/2020	11:48	1/26/20 11:48	31.76
1/26/2020	12:32	1/26/20 12:32	32.34
1/26/2020	13:44	1/26/20 13:44	31.77
1/26/2020	14:32	1/26/20 14:32	32.33
1/26/2020	15:39	1/26/20 15:39	32.34
1/26/2020	16:12	1/26/20 16:12	32.35
1/27/2020	8:21	1/27/20 8:21	31.59

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	MW-82-112
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	36 to 57 ft bgs
Approximate Distance from Testing Well	120 ft

Date	Time	Date and Time	Depth to Water
1/24/2020	16:06	1/24/20 16:06	32.32
1/25/2020	7:25	1/25/20 7:25	32.28
1/25/2020	8:34	1/25/20 8:34	32.32
1/25/2020	9:42	1/25/20 9:42	32.33
1/25/2020	10:33	1/25/20 10:33	32.37
1/25/2020	11:42	1/25/20 11:42	32.41
1/25/2020	12:34	1/25/20 12:34	32.45
1/25/2020	13:42	1/25/20 13:42	32.47
1/25/2020	14:34	1/25/20 14:34	32.51
1/25/2020	15:34	1/25/20 15:34	32.51
1/25/2020	16:15	1/25/20 16:15	32.44
1/26/2020	7:17	1/26/20 7:17	32.21
1/26/2020	8:32	1/26/20 8:32	32.28
1/26/2020	9:47	1/26/20 9:47	32.33
1/26/2020	10:33	1/26/20 10:33	32.39
1/26/2020	11:47	1/26/20 11:47	32.42
1/26/2020	12:33	1/26/20 12:33	32.46
1/26/2020	13:43	1/26/20 13:43	32.46
1/26/2020	14:33	1/26/20 14:33	32.49
1/26/2020	15:38	1/26/20 15:38	33.06
1/26/2020	16:13	1/26/20 16:13	32.98
1/27/2020	8:20	1/27/20 8:20	31.96

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	MW-82-168
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	36 to 57 ft bgs
Approximate Distance from Testing Well	120 ft

Date	Time	Date and Time	Depth to Water
1/24/2020	16:02	1/24/20 16:02	32.17
1/25/2020	7:36	1/25/20 7:36	32.14
1/25/2020	8:33	1/25/20 8:33	32.40
1/25/2020	9:44	1/25/20 9:44	32.46
1/25/2020	10:32	1/25/20 10:32	32.69
1/25/2020	11:43	1/25/20 11:43	32.74
1/25/2020	12:33	1/25/20 12:33	33.00
1/25/2020	13:43	1/25/20 13:43	33.03
1/25/2020	14:33	1/25/20 14:33	33.31
1/25/2020	15:35	1/25/20 15:35	33.33
1/25/2020	16:14	1/25/20 16:14	33.41
1/26/2020	7:16	1/26/20 7:16	32.08
1/26/2020	8:34	1/26/20 8:34	32.17
1/26/2020	9:46	1/26/20 9:46	32.19
1/26/2020	10:34	1/26/20 10:34	32.23
1/26/2020	11:46	1/26/20 11:46	32.24
1/26/2020	12:34	1/26/20 12:34	32.25
1/26/2020	13:42	1/26/20 13:42	32.25
1/26/2020	14:34	1/26/20 14:34	32.83
1/26/2020	15:37	1/26/20 15:37	32.81
1/26/2020	16:14	1/26/20 16:14	32.78
1/27/2020	8:18	1/27/20 8:18	31.82

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

Specific Capacity/
Injection Test Monitoring Point

ARCADIS Design & Consultancy for natural and built assets

Location/Well ID	MW-82-198
Well Being Tested	IRZ-17
Screened Interval of Well Being Tested	36 to 57 ft bgs
Approximate Distance from Testing Well	120 ft

Date	Time	Date and Time	Depth to Water
1/24/2020	16:03	1/24/20 16:03	31.89
1/25/2020	7:27	1/25/20 7:27	31.86
1/25/2020	8:32	1/25/20 8:32	32.08
1/25/2020	9:45	1/25/20 9:45	32.13
1/25/2020	10:31	1/25/20 10:31	32.32
1/25/2020	11:44	1/25/20 11:44	32.38
1/25/2020	12:32	1/25/20 12:32	32.57
1/25/2020	13:44	1/25/20 13:44	32.62
1/25/2020	14:32	1/25/20 14:32	32.83
1/25/2020	15:36	1/25/20 15:36	32.86
1/25/2020	16:13	1/25/20 16:13	32.16
1/26/2020	7:15	1/26/20 7:15	31.81
1/26/2020	8:35	1/26/20 8:35	31.88
1/26/2020	9:45	1/26/20 9:45	31.91
1/26/2020	10:34	1/26/20 10:34	31.94
1/26/2020	11:45	1/26/20 11:45	31.95
1/26/2020	12:35	1/26/20 12:35	31.96
1/26/2020	13:41	1/26/20 13:41	32.51
1/26/2020	14:35	1/26/20 14:35	32.50
1/26/2020	15:36	1/26/20 15:36	32.51
1/26/2020	16:15	1/26/20 16:15	32.46
1/27/2020	8:17	1/27/20 8:17	31.56

Acronyms & Abbreviations

bgs = below ground surface

ft = feet

MW-31-060 During IRZ-17 Upper Screen (36 to 57 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-17: ~136 Feet
Legend
Transducer
Manual
Depth to Water (feet)
42
42.2
42.4
42.6
42.8
43
43.2
43.4
1/26/20 6:00
1/26/20 9:00
1/26/20 12:00
1/26/20 15:00
1/26/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 905.0 gal
Avg. Flow Rate: 7.56 gpm
Drawdown in IRZ-17: 0.41 ft
Specific Capacity: 18.43 gpm/ft
Step 2:
Total Volume Pumped: 1804.9 gal
Avg. Flow Rate: 14.90 gpm
Drawdown in IRZ-17: 0.88 ft
Specific Capacity: 16.93 gpm/ft
Step 3:
Total Volume Pumped: 2726.2 gal
Avg. Flow Rate: 22.69 gpm
Drawdown in IRZ-17: 1.41 ft
Specific Capacity: 16.09 gpm/ft
Step 4:
Total Volume Pumped: 3625.8 gal
Avg. Flow Rate: 30.17 gpm
Drawdown in IRZ-17: 1.94 ft
Specific Capacity: 15.55 gpm/ft

MW-31-135 During IRZ-17 Upper Screen (36 to 57 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-17: ~173 Feet
Legend
Transducer
Manual
Depth to Water (feet)
43.7
43.8
43.9
44
44.1
44.2
44.3
44.4
44.5
1/26/20 6:00
1/26/20 9:00
1/26/20 12:00
1/26/20 15:00
1/26/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 905.0 gal
Avg. Flow Rate: 7.56 gpm
Drawdown in IRZ-17: 0.41 ft
Specific Capacity: 18.43 gpm/ft
Step 2:
Total Volume Pumped: 1804.9 gal
Avg. Flow Rate: 14.90 gpm
Drawdown in IRZ-17: 0.88 ft
Specific Capacity: 16.93 gpm/ft
Step 3:
Total Volume Pumped: 2726.2 gal
Avg. Flow Rate: 22.69 gpm
Drawdown in IRZ-17: 1.41 ft
Specific Capacity: 16.09 gpm/ft
Step 4:
Total Volume Pumped: 3625.8 gal
Avg. Flow Rate: 30.17 gpm
Drawdown in IRZ-17: 1.94 ft
Specific Capacity: 15.55 gpm/ft

MW-77-046R During IRZ-17 Upper Screen (36 to 57 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-17: ~103 Feet
Legend
Transducer
Manual
Depth to Water (feet)
25.6
25.8
26
26.2
26.4
26.6
26.8
27
1/26/20 6:00
1/26/20 9:00
1/26/20 12:00
1/26/20 15:00
1/26/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 905.0 gal
Avg. Flow Rate: 7.56 gpm
Drawdown in IRZ-17: 0.41 ft
Specific Capacity: 18.43 gpm/ft
Step 2:
Total Volume Pumped: 1804.9 gal
Avg. Flow Rate: 14.90 gpm
Drawdown in IRZ-17: 0.88 ft
Specific Capacity: 16.93 gpm/ft
Step 3:
Total Volume Pumped: 2726.2 gal
Avg. Flow Rate: 22.69 gpm
Drawdown in IRZ-17: 1.41 ft
Specific Capacity: 16.09 gpm/ft
Step 4:
Total Volume Pumped: 3625.8 gal
Avg. Flow Rate: 30.17 gpm
Drawdown in IRZ-17: 1.94 ft
Specific Capacity: 15.55 gpm/ft

MW-77-102 During IRZ-17 Upper Screen (36 to 57 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Transducer was not used
Distance to IRZ-17: ~113 Feet
Legend
Manual
Depth to Water (feet)
26.5
26.6
26.7
26.8
26.9
27.0
27.1
27.2
1/26/20 6:00
1/26/20 9:00
1/26/20 12:00
1/26/20 15:00
1/26/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 905.0 gal
Avg. Flow Rate: 7.56 gpm
Drawdown in IRZ-17: 0.41 ft
Specific Capacity: 18.43 gpm/ft
Step 2:
Total Volume Pumped: 1804.9 gal
Avg. Flow Rate: 14.90 gpm
Drawdown in IRZ-17: 0.88 ft
Specific Capacity: 16.93 gpm/ft
Step 3:
Total Volume Pumped: 2726.2 gal
Avg. Flow Rate: 22.69 gpm
Drawdown in IRZ-17: 1.41 ft
Specific Capacity: 16.09 gpm/ft
Step 4:
Total Volume Pumped: 3625.8 gal
Avg. Flow Rate: 30.17 gpm
Drawdown in IRZ-17: 1.94 ft
Specific Capacity: 15.55 gpm/ft

MW-77-158 During IRZ-17 Upper Screen (36 to 57 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-17: ~108 Feet
Legend
Transducer
Manual
Depth to Water (feet)
26.9
27.0
27.1
27.2
27.3
27.4
27.5
27.6
27.7
27.8
1/26/20 6:00
1/26/20 9:00
1/26/20 12:00
1/26/20 15:00
1/26/20 18:00
Date and Time
Step 1:
Total Volume Pumped: 905.0 gal
Avg. Flow Rate: 7.56 gpm
Drawdown in IRZ-17: 0.41 ft
Specific Capacity: 18.43 gpm/ft
Step 2:
Total Volume Pumped: 1804.9 gal
Avg. Flow Rate: 14.90 gpm
Drawdown in IRZ-17: 0.88 ft
Specific Capacity: 16.93 gpm/ft
Step 3:
Total Volume Pumped: 2726.2 gal
Avg. Flow Rate: 22.69 gpm
Drawdown in IRZ-17: 1.41 ft
Specific Capacity: 16.09 gpm/ft
Step 4:
Total Volume Pumped: 3625.8 gal
Avg. Flow Rate: 30.17 gpm
Drawdown in IRZ-17: 1.94 ft
Specific Capacity: 15.55 gpm/ft

MW-77-187 During IRZ-17 Upper Screen (36 to 57 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Transducer was not used
Distance to IRZ-17: ~108 Feet
Legend
Manual
Depth to Water (feet)
26.8
26.9
27.0
27.1
27.2
27.3
27.4
Step 1:
Total Volume Pumped: 905.0 gal
Avg. Flow Rate: 7.56 gpm
Drawdown in IRZ-17: 0.41 ft
Specific Capacity: 18.43 gpm/ft
Step 2:
Total Volume Pumped: 1804.9 gal
Avg. Flow Rate: 14.90 gpm
Drawdown in IRZ-17: 0.88 ft
Specific Capacity: 16.93 gpm/ft
Step 3:
Total Volume Pumped: 2726.2 gal
Avg. Flow Rate: 22.69 gpm
Drawdown in IRZ-17: 1.41 ft
Specific Capacity: 16.09 gpm/ft
Step 4:
Total Volume Pumped: 3625.8 gal
Avg. Flow Rate: 30.17 gpm
Drawdown in IRZ-17: 1.94 ft
Specific Capacity: 15.55 gpm/ft
1/26/20 6:00
1/26/20 9:00
1/26/20 12:00
1/26/20 15:00
1/26/20 18:00
Date and Time

MW-82-046 During IRZ-17 Upper Screen (36 to 57 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-17: ~120 Feet
Legend
Transducer
Manual
Depth to Water (feet)
31.5
31.6
31.7
31.8
31.9
32.0
32.1
32.2
32.3
32.4
Step 1:
Total Volume Pumped: 905.0 gal
Avg. Flow Rate: 7.56 gpm
Drawdown in IRZ-17: 0.41 ft
Specific Capacity: 18.43 gpm/ft
Step 2:
Total Volume Pumped: 1804.9 gal
Avg. Flow Rate: 14.90 gpm
Drawdown in IRZ-17: 0.88 ft
Specific Capacity: 16.93 gpm/ft
Step 3:
Total Volume Pumped: 2726.2 gal
Avg. Flow Rate: 22.69 gpm
Drawdown in IRZ-17: 1.41 ft
Specific Capacity: 16.09 gpm/ft
Step 4:
Total Volume Pumped: 3625.8 gal
Avg. Flow Rate: 30.17 gpm
Drawdown in IRZ-17: 1.94 ft
Specific Capacity: 15.55 gpm/ft
Possible water level meter malfunction
1/26/20 6:00
1/26/20 9:00
1/26/20 12:00
1/26/20 15:00
1/26/20 18:00
Date and Time

MW-82-112 During IRZ-17 Upper Screen (36 to 57 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Transducer was not used
Distance to IRZ-17: ~120 Feet
Legend
Manual
Possible water level meter malfunction
Step 1:
Total Volume Pumped: 905.0 gal
Avg. Flow Rate: 7.56 gpm
Drawdown in IRZ-17: 0.41 ft
Specific Capacity: 18.43 gpm/ft
Step 2:
Total Volume Pumped: 1804.9 gal
Avg. Flow Rate: 14.90 gpm
Drawdown in IRZ-17: 0.88 ft
Specific Capacity: 16.93 gpm/ft
Step 3:
Total Volume Pumped: 2726.2 gal
Avg. Flow Rate: 22.69 gpm
Drawdown in IRZ-17: 1.41 ft
Specific Capacity: 16.09 gpm/ft
Step 4:
Total Volume Pumped: 3625.8 gal
Avg. Flow Rate: 30.17 gpm
Drawdown in IRZ-17: 1.94 ft
Specific Capacity: 15.55 gpm/ft
Depth to Water (feet)
31.8
32.0
32.2
32.4
32.6
32.8
33.0
33.2
33.4
1/26/20 6:00
1/26/20 9:00
1/26/20 12:00
1/26/20 15:00
1/26/20 18:00
Date and Time

MW-82-168 During IRZ-17 Upper Screen (36 to 57 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Distance to IRZ-17: ~120 Feet
Legend
Transducer
Manual
Possible water level meter malfunction
Step 1:
Total Volume Pumped: 905.0 gal
Avg. Flow Rate: 7.56 gpm
Drawdown in IRZ-17: 0.41 ft
Specific Capacity: 18.43 gpm/ft
Step 2:
Total Volume Pumped: 1804.9 gal
Avg. Flow Rate: 14.90 gpm
Drawdown in IRZ-17: 0.88 ft
Specific Capacity: 16.93 gpm/ft
Step 3:
Total Volume Pumped: 2726.2 gal
Avg. Flow Rate: 22.69 gpm
Drawdown in IRZ-17: 1.41 ft
Specific Capacity: 16.09 gpm/ft
Step 4:
Total Volume Pumped: 3625.8 gal
Avg. Flow Rate: 30.17 gpm
Drawdown in IRZ-17: 1.94 ft
Specific Capacity: 15.55 gpm/ft
Depth to Water (feet)
31.6
31.8
32.0
32.2
32.4
32.6
32.8
33.0
33.2
33.4
1/26/20 6:00
1/26/20 9:00
1/26/20 12:00
1/26/20 15:00
1/26/20 18:00
Date and Time

MW-82-198 During IRZ-17 Upper Screen (36 to 57 ft) Specific Capacity Test
Step 1
Step 2
Step 3
Step 4
Transducer was not used
Distance to IRZ-17: ~120 Feet
Legend
Manual
Possible water level meter malfunction
Step 1:
Total Volume Pumped: 905.0 gal
Avg. Flow Rate: 7.56 gpm
Drawdown in IRZ-17: 0.41 ft
Specific Capacity: 18.43 gpm/ft
Step 2:
Total Volume Pumped: 1804.9 gal
Avg. Flow Rate: 14.90 gpm
Drawdown in IRZ-17: 0.88 ft
Specific Capacity: 16.93 gpm/ft
Step 3:
Total Volume Pumped: 2726.2 gal
Avg. Flow Rate: 22.69 gpm
Drawdown in IRZ-17: 1.41 ft
Specific Capacity: 16.09 gpm/ft
Step 4:
Total Volume Pumped: 3625.8 gal
Avg. Flow Rate: 30.17 gpm
Drawdown in IRZ-17: 1.94 ft
Specific Capacity: 15.55 gpm/ft
Depth to Water (feet)
31.4
31.6
31.8
32.0
32.2
32.4
32.6
32.8
33.0
1/26/20 6:00
1/26/20 9:00
1/26/20 12:00
1/26/20 15:00
1/26/20 18:00
Date and Time