



*Practical Solutions
In Groundwater Science*

6155 East Indian School Rd.
Suite 200
Scottsdale, Arizona 85251
480-659-7131 office
480-659-7143 fax
www.clearcreekassociates.com

Via Electronic Mail

July 13, 2015

Mr. Darryl Crossman, City Manager
City of Litchfield Park
214 W. Wigwam Boulevard
Litchfield Park, AZ 85340

Re: Monthly Update, PGA-North Superfund Site

Dear Mr. Crossman:

As requested, following is a brief update on activities at the Phoenix-Goodyear Airport (PGA) North Superfund Site for the period from May 2015 through early June 2015.

RECENT MONITOR WELL RESULTS

Figure 1, attached, is a summary of recent monitoring results for the northern portion of the Site. The results from the May 2015 sampling event are generally consistent with prior results. Figure 2 is an updated plume boundary map based on the May 2015 sampling results. There has been no significant change in the plume footprint. Notable findings or exceptions for the May results are summarized below.

- At EPA MW-13A (South of I-10 and west of Litchfield Road) TCE was detected at 314 ug/L, up from the previous months' concentration of 16.8 ug/L. This is generally consistent with the historical trend observed at this well attributed to regional pumping patterns.
- At EPA MW-63A, located on the west side of Litchfield Road, approximately 500 feet north of Van Buren, TCE concentrations were observed at 60.8 ug/L, up from the previous months' concentration of 49.4 ug/L. The TCE concentration trend at this location has reverted back to an increasing trend. Crane Co. New extraction well EA-10 has been installed along Van Buren in the vicinity of former extraction well EA-04 to enhance on-site capture. Currently, EA-10 is operated in manual mode during business hours until the well can be integrated into the MTS automated control system.

- At EPA MW-48A, located on the east side of Litchfield Road, approximately ¼-mile south of Interstate 10, TCE concentrations were observed at 222 ug/L, down from the prior month's result of 232 ug/L. Although seasonal variability has been observed in EPA MW-48A, historical trends have shown a gradual decline in peak concentrations since 2013.
- At EPA MW-51A, located in the Pebble Creek community located along W Robson Circle North, northwest of 147th Lane, TCE concentrations were at 4.2 ug/L, a slight increase from the previous month's result of 3.2 ug/L. Future results will be evaluated to confirm the trend; however, decreases are expected to result from injection being conducted in the northwest portion of the Site.

CONDUIT WELL UPDATE

Monitoring results for irrigation well 27C collected from Subunit A sample (above the inflatable packer) were 3.8 ug/L, consistent with the previous months' result. Concentrations in Subunit A have been below the aquifer water quality standard of 5 ug/L for several months. However, TCE concentrations in the deeper (Subunit C) sample remain above 5 ug/L. The sample collected from below the inflatable packer in Subunit C was detected at 5.2 ug/L, down slightly from the previous month's result of 5.6 ug/L.

SOURCE AREA INVESTIGATION & REMEDIATION

Crane Co is preparing plans and schedule for implementing the bench scale pilot tests that will be conducted in support of the source area remediation effort.

PLUME CONTAINMENT

A water level contour map for May 2015 is included as Figure 3. Approximately 10% of the water extracted from the EA-06/EA-07 treatment system was utilized by Goodyear for park irrigation; this is consistent with the usage seen last year. Average flow rates in the injection wells for May were 175 gpm, 244 gpm, and 140 gpm in IA-11, IA-12 and IA-15, respectively, (Figure 4). The average reported flow rates for IA-07 and IA-08 for May were 158 and 164 gpm, respectively, generally consistent with the previous months' rates (Figure 4). Groundwater elevations in the vicinity of injection well IA-12 were generally consistent with the previous month's monitoring event (Figure 5). Average flow rates, based on operational uptime, for the off-site extraction wells are shown on Figure 6. The operational uptime for the EA-06/EA-07 treatment system was consistent with the prior month. The average reported flow rates for EA-06 and EA-07 for May were 407 gpm and 226 gpm, respectively. The average reported flow rate for EA-08 for May was 330 gpm, which is consistent with the previous months' flow rate.

* * * * *

Sincerely,
Clear Creek Associates, PLC



Thomas R. Suriano, R.G.
Principal Hydrogeologist

Attachments:

- Figure 1: Recent Analytical Results
- Figure 2: TCE Plume in Subunit A, May 2015
- Figure 3: Groundwater Elevation Contour Map, May 2015
- Figure 4: Average Injection Rates
- Figure 5: Groundwater Elevations in Monitor Wells near IA-12
- Figure 6: Average Extraction Rates

cc: (e-copies)
Mary Rose Evans – City of Litchfield Park
Susan Goodwin – City Attorney
Woody Scoutten – EPS Group

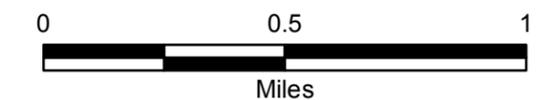
PGA North Superfund Site

Goodyear, Arizona

Legend

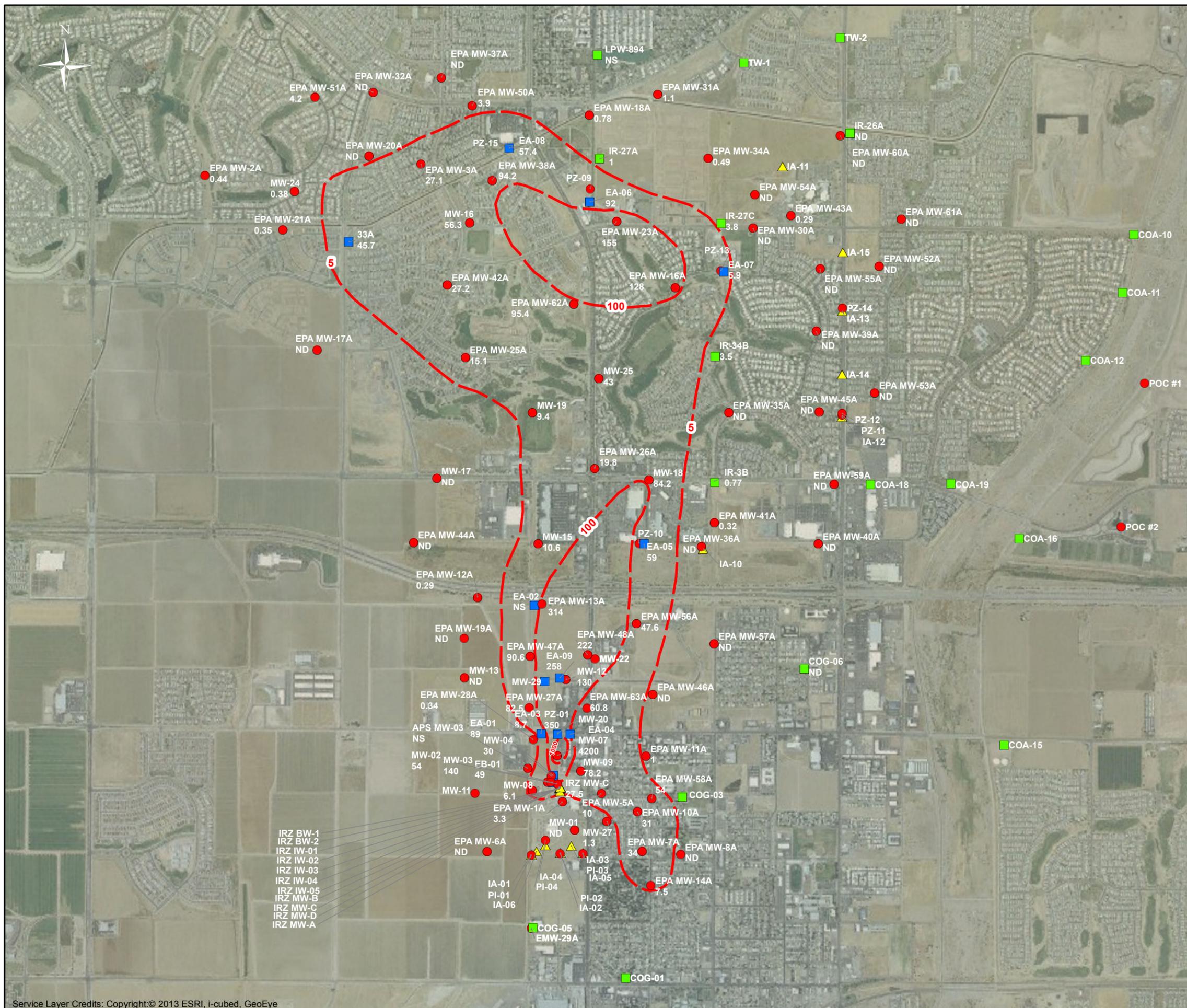
- Extraction Well
- ▲ Injection Well
- Monitor Well Subunit A
- Supply Well
- ⬢ TCE Contours, 5, 100, and 1,000 ug/L
- MW-19 Well Name
9.4 TCE Concentration (in ug/L)

ND - Non Detect
NS - Not Sampled

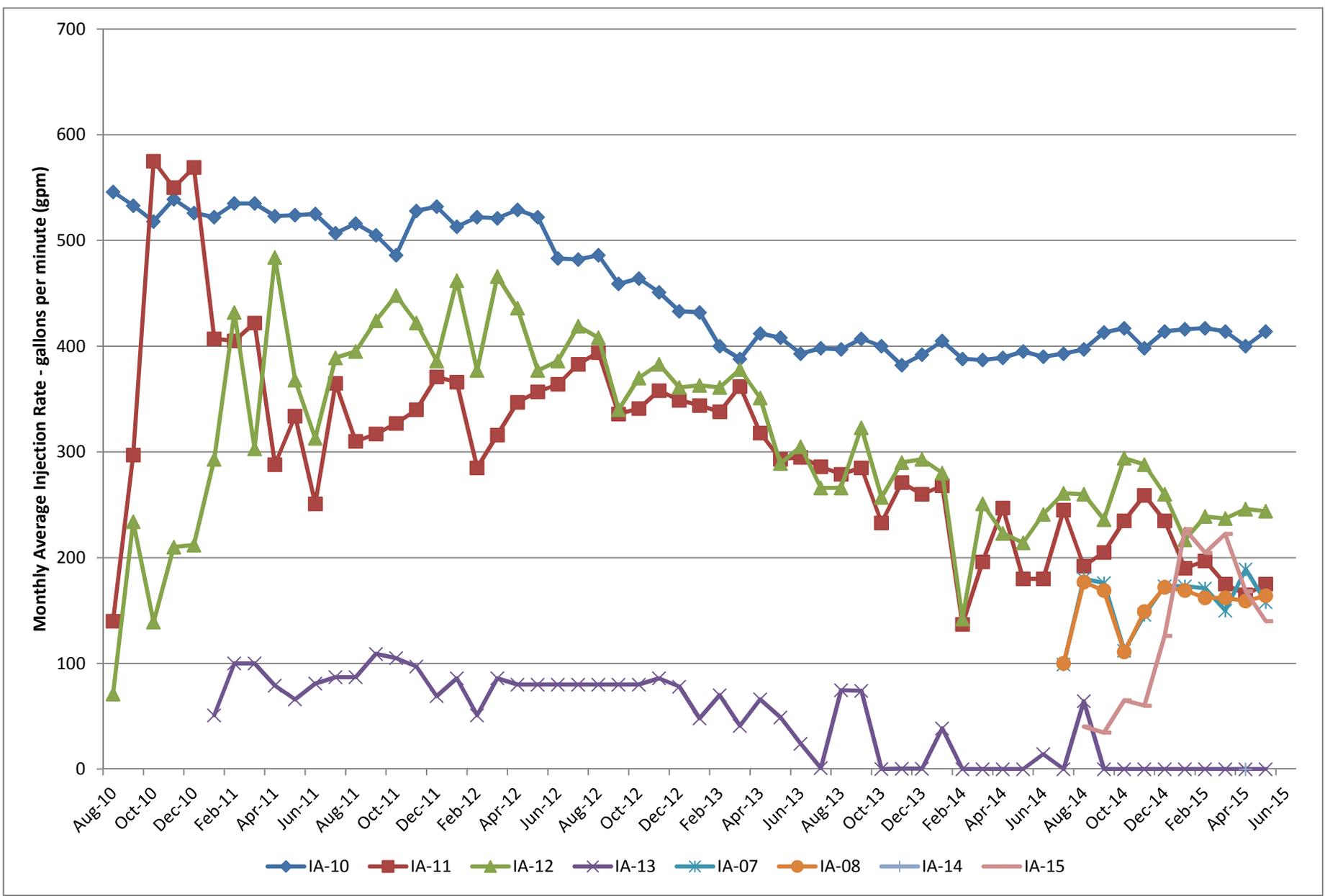


CLEAR CREEK ASSOCIATES 6155 East Indian School Road
Suite 200
Scottsdale, Arizona 85251
(480) 659-7131

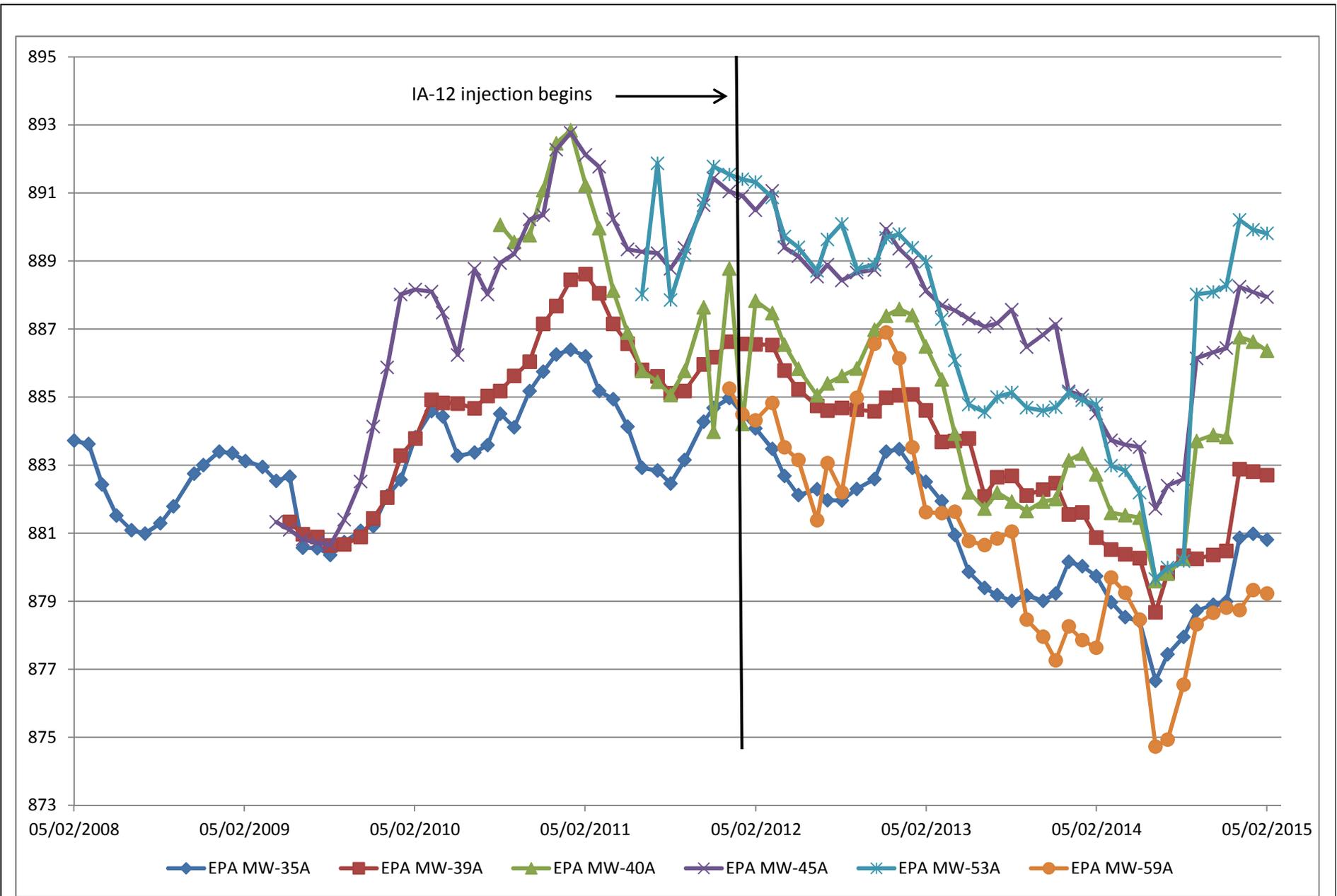
Figure 2 TCE Plume in Subunit A May 2015



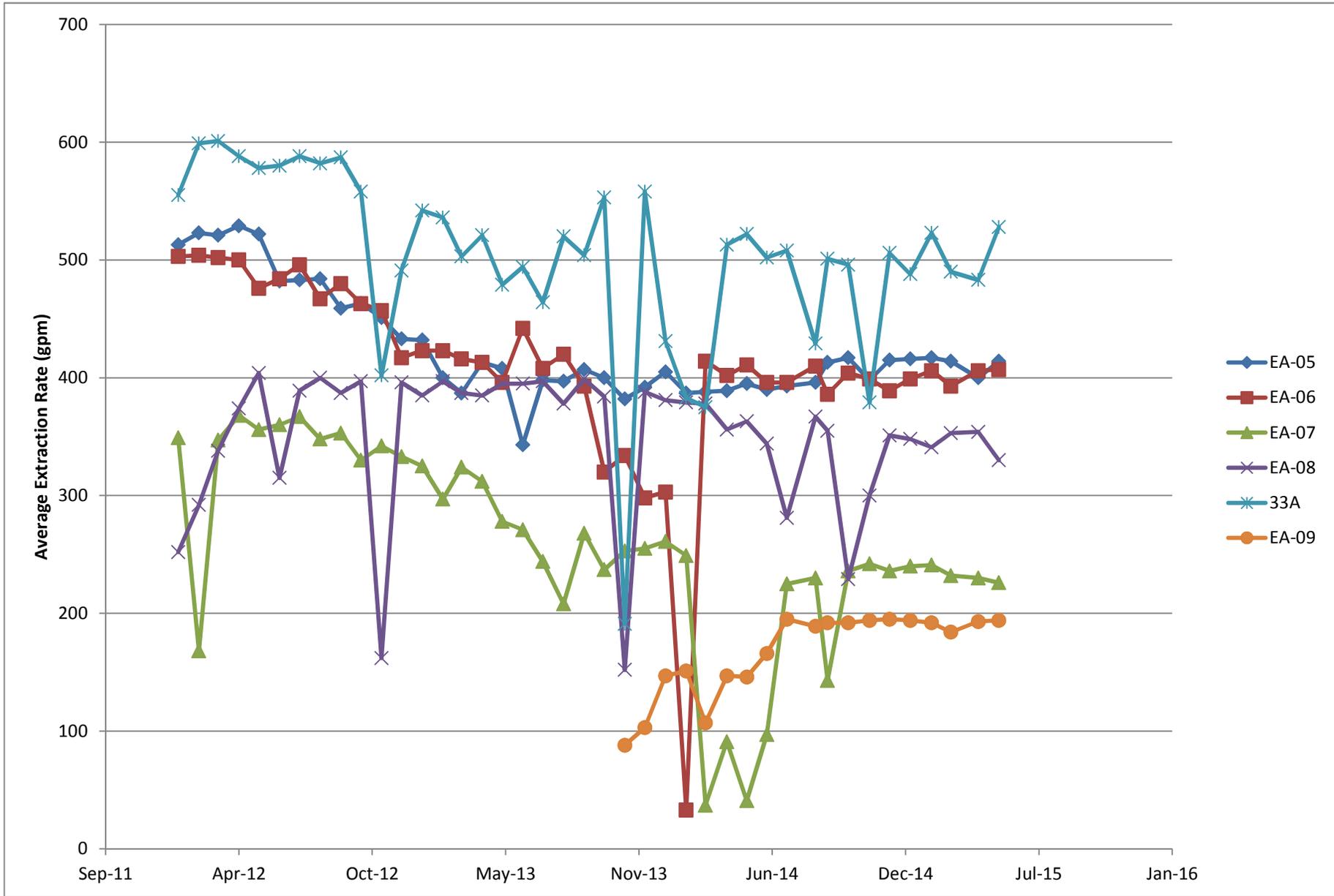
- IRZ BW-1
- IRZ BW-2
- IRZ IW-01
- IRZ IW-02
- IRZ IW-03
- IRZ IW-04
- IRZ IW-05
- IRZ MW-B
- IRZ MW-C
- IRZ MW-D
- IRZ MW-A



PGA-North Average Injection Rates					
Approved	Date	Author	Date	File Name	Figure
TRS		GJM	6/23/15	Injection Rates_2	4



Groundwater Elevations in Monitor Wells Near IA-12					
Approved	Date	Author	Date	File Name	Figure
TRS		GJM	6/23/15	Injection Rates_2	5



PGA-North Average Extraction Rates					
Approved	Date	Author	Date	File Name	Figure
TRS		GJM	6/23/15	Injection Rates_2	6

In accordance with the agreement between the City of Litchfield Park (COLP) and Crane Co., please find relevant portions of the May 2015 Groundwater Monthly Report and Remediation System Performance Summary as it pertains to the northeast and northwest portions of the Subunit A trichloroethylene (TCE) plume associated with the Phoenix-Goodyear Airport-North (PGA-North) Superfund Site in Goodyear, Arizona.

The northeast area Subunit A TCE plume groundwater remediation systems consist of three groundwater extraction wells (EA-05, EA-06, and EA-07), and six groundwater injection wells (IA-10, IA-11, IA-12, IA-13, IA-14, and IA-15). These remediation systems were installed to remove TCE mass from groundwater, maintain an effective hydraulic barrier west of Dysart Road, protect the water supply wells in the area, reduce TCE concentrations in the area, and ultimately restore the Subunit A aquifer. The groundwater pumped from extraction well EA-05 is treated at the EA-05 groundwater treatment system (GTS) and re-injected into injection well IA-10. The groundwater pumped from extraction wells EA-06 and EA-07 is treated at the EA-06 GTS and re-injected into injection wells IA-11, IA-12, IA-13, and IA-15. Injection wells IA-11 and IA-12 came online in August 2010, injection well IA-13 came online in January 2011, and injection well IA-15 came online August 2014 with all flow from IA-13 diverted to this well. Injection well IA-14 is installed and connected to the system, but currently is not being used due to the effective hydraulic barrier that is currently being provided by primarily three injection wells IA-11, IA-12, and IA-15.

The northwest area Subunit A TCE plume groundwater remediation systems consist of two groundwater extraction wells (33A and EA-08) and two groundwater injection wells (IA-07 and IA-08). Extraction well 33A came on line in 1997, and extraction well EA-08 came on line in December 2011. The groundwater pumped from 33A is treated at the 33A GTS, and is used for irrigation by the Palm Valley Lakes Golf Course, or is discharged to the Roosevelt Irrigation District (RID) canal. The groundwater pumped from EA-08 is treated at the EA-08 GTS, and is conveyed to injection wells IA-07 and IA-08, to provide a hydraulic barrier in the northwest area, protect water supply wells, and reduce the size of the plume.

The average groundwater extraction and injection rates for the northeast and northwest area remediation system wells during May 2015 are summarized below:

Northeast Area

- EA-05 – 414 gallons per minute (gpm)
- EA-06 – 407 gpm
- EA-07 – 226 gpm
- IA-10 – 414 gpm
- IA-11 – 175 gpm
- IA-12 – 244 gpm
- IA-13 – 0 gpm
- IA-15 – 140 gpm

Northwest Area

- EA-08 – 330 gpm
- 33A – 528 gpm
- IA-07 – 158 gpm
- IA-08 – 164 gpm

A. Treatment Systems and TCE Mass Removal

EA-05 GTS

During this reporting period, approximately 16.7 million gallons (Mgals) of groundwater was extracted and treated at the EA-05 Groundwater Treatment System (GTS); removing 8.2 pounds of TCE.

EA-06 GTS

During this reporting period, approximately 25.5 Mgals of groundwater was extracted from extraction wells EA-06 and EA-07, and treated at the EA-06 GTS; removing 15.4 pounds of TCE.

EA-08 GTS

During this reporting period, approximately 13.3 Mgals of groundwater was extracted and treated at the EA-08 GTS; removing 6.4 pounds of TCE.

33A GTS

During this reporting period, approximately 21.3 Mgals of groundwater was extracted and treated at the 33A GTS; removing approximately 8.1 pounds of TCE.

B. Northeast Area Subunit A Groundwater Quality and Plume Extent

The May 2015 analytical results indicate that the northeast portion of the Subunit A TCE plume continues to be delineated by monitor wells EPA MW-18A, EPA MW-30A, EPA MW-31A, EPA MW-34A, EPA MW-35A, EPA MW-36A, EPA MW-39A, EPA MW-40A, EPA MW-41A, EPA MW-43A, EPA MW-45A, EPA MW-52A, EPA MW-53A, EPA MW-54A, and EPA MW-55A, EPA MW-59A, EPA MW-60A, EPA MW-61A, and IR-34B (Figure 1). Groundwater samples collected from these wells continue to exhibit TCE concentrations that are either below the laboratory detection limit or are less than the United States Environmental Protection Agency (USEPA) Maximum Contaminant Level (MCL) of 5 µg/L.

In the IA-12 area, since injection of treated groundwater commenced in August 2010, TCE concentration trends for key performance monitor wells continue to indicate that the Subunit A plume continues to be reduced in size. For example:

- Historically, TCE concentrations in EPA MW-35A, (Figure 2) typically peaked during the winter and spring months in response to rising groundwater levels related to the reduced pumping schedules from local irrigation and supply wells. In February 2010, TCE was reported at a concentration of 48 µg/L in EPA MW-35A. However, since the injection of treated water began into injection wells IA-12, IA-13 and most recently (August 2014) IA-15, TCE concentrations have been reduced by two orders of magnitude in this well, and

continue to remain low; the most recent (May 2015) TCE concentration for this well was below the laboratory detection limit of 0.20 µg/L.

- In IR-34B TCE was reported at a concentration of 180 µg/L in July 2009. However since the initiation of injection of treated water into wells IA-11, IA-12, IA-13, and most recently IA-15, TCE concentrations have been reduced by two orders of magnitude. The most recent (May 2015) TCE concentration for this well is 3.5 µg/L, which is below the MCL.
- In monitor wells EPA MW-39A, EPA MW-40A, EPA MW-41A, EPA MW-45A, EPA MW-55A and EPA MW-59A the most recent (May 2015) TCE concentrations have remained below the laboratory detection limit of 0.20 µg/L.

Similarly, in the area of injection well IA-11 and IA-15, TCE concentrations have decreased in monitor wells EPA MW-30A, EPA MW-43A, and EPA MW-54A. For example:

- In monitor well EPA MW-30A, concentrations have decreased from 29 µg/L in August 2010 to below the detection limit of 0.20 µg/L in May 2015;
- In monitor well EPA MW-43A, concentrations have decreased from 6.3 µg/L in August 2010 to 0.29 µg/L (below the MCL) in May 2015.
- In monitor well EPA MW-54A, concentrations have decreased from 28 µg/L in October 2010 to below the laboratory detection limit of 0.20 µg/L in May 2015.

The TCE concentration trends for northeast area wells continue to demonstrate that the plume in this area is defined and has continued to decrease in size as a result of the extraction operations at EA-05, EA-06, and EA-07 and the reinjection of treated groundwater into injection wells IA-10, IA-11, IA-12, and IA-15.

C. Northwest Area Subunit A Groundwater Quality and Plume Extent

The May 2015 analytical results indicate that the northwest portion of the Subunit A TCE plume is delineated by monitor wells MW-17, EPA MW-17A, EPA MW-20A, EPA MW-21A, EPA MW-32A, EPA MW-37A, EPA MW-50A, EPA MW-51A, and MW-24 (Figure 1). Groundwater samples collected from these wells exhibit TCE concentrations that are either below the laboratory detection limit or are less than the USEPA MCL of 5 µg/L.

In the EA-08 GTS area, since the startup of Extraction well EA-08 in December 2011, TCE concentrations in key performance monitor well (EPA MW-50A) continue to indicate TCE mass in the area has been reduced. For example:

- In sentinel monitor well EPA MW-50A, TCE concentrations have decreased from 19 µg/L in October 2010 to 3.9 µg/L in May 2015 (Figure 1).

In the 33A GTS area, northwest area sentinel wells continue to indicate that the plume is defined to concentrations less than the laboratory reporting limit, or less than the MCL with the exception of monitor well EPA MW-51A.

- In monitor well EPA MW-51A, TCE concentration was 4.2 µg/L in May 2015 (Figure 1). As the injection of treated water to injection wells IA-07 and IA-08 continue, TCE concentrations in this well are expected to be reduced.

- In interior monitor well MW-16, the May 2015 TCE concentration was 56.3 µg/L (Figure 1). Due to the interior location of the well, the aquifer dynamics in this area, and the historic high TCE mass in the area, TCE concentrations may remain above the MCL and may occasionally spike as shown in Figure 3.

D. Groundwater Elevations and Flow Directions

Northeast Area

The May 2015 groundwater elevations in key northeast area monitor wells (EPA MW-30A, EPA MW-34A, EPA MW-35A, EPA MW-39A, EPA MW- 43A, EPA MW-45A, EPA MW-54A, and EPA MW-55A) continue to indicate an effective hydraulic barrier and groundwater mound west of Dysart Road that is maintained by the injection of treated groundwater into injection wells IA-11, IA-12, and IA-15 (Figure 4 and Figure 5). Additionally, groundwater elevations and flow vectors calculated for May 2015 continue to demonstrate that the operation of the extraction and injection wells in this area are maintaining groundwater flow directions away from the Litchfield Park and COA water supply wells in the area and toward extraction wells EA-06 and EA-07 (Figure 6).

Northwest Area

In the northwest area, the extraction operations at 33A, EA-08, and injection wells IA-07 and IA-08 are the dominant potentiometric features. Groundwater elevations in key monitor wells PZ-16, PZ-17, EPA MW-3A, EPA MW-20A, EPA MW-32A, EPA MW-37A continue to indicate that an effective hydraulic barrier has been developed in the northwest area by the injection of treated water into IA-07 and IA-08 (Figure 7). The small gap in hydraulic capture that had previously existed between extraction wells 33A and EA-08 has been eliminated by the injection of treated water into these wells.

E. Activities Planned for July 2015

- Continued operation and maintenance of the existing groundwater treatment systems.
- Monthly groundwater sampling and water level measurements of key performance and plume delineation monitor wells north of I-10.
- Continue to evaluate water levels, TCE concentrations, and groundwater flow directions in the northeast area. Make flow rate adjustments to the injection wells as necessary to maintain hydraulic control and protect water supply wells.
- Monitor and evaluate the mounding from the injection of treated water from extraction well EA-08 to new injection wells IA-07, and IA-08.

Please feel free to contact me if you have any questions or if you need additional information.

Regards,

Harry Brenton, RG

Director of Hydrogeological Services

Matrix New World Engineering, Inc.
250 N. Litchfield Rd. Suite 201

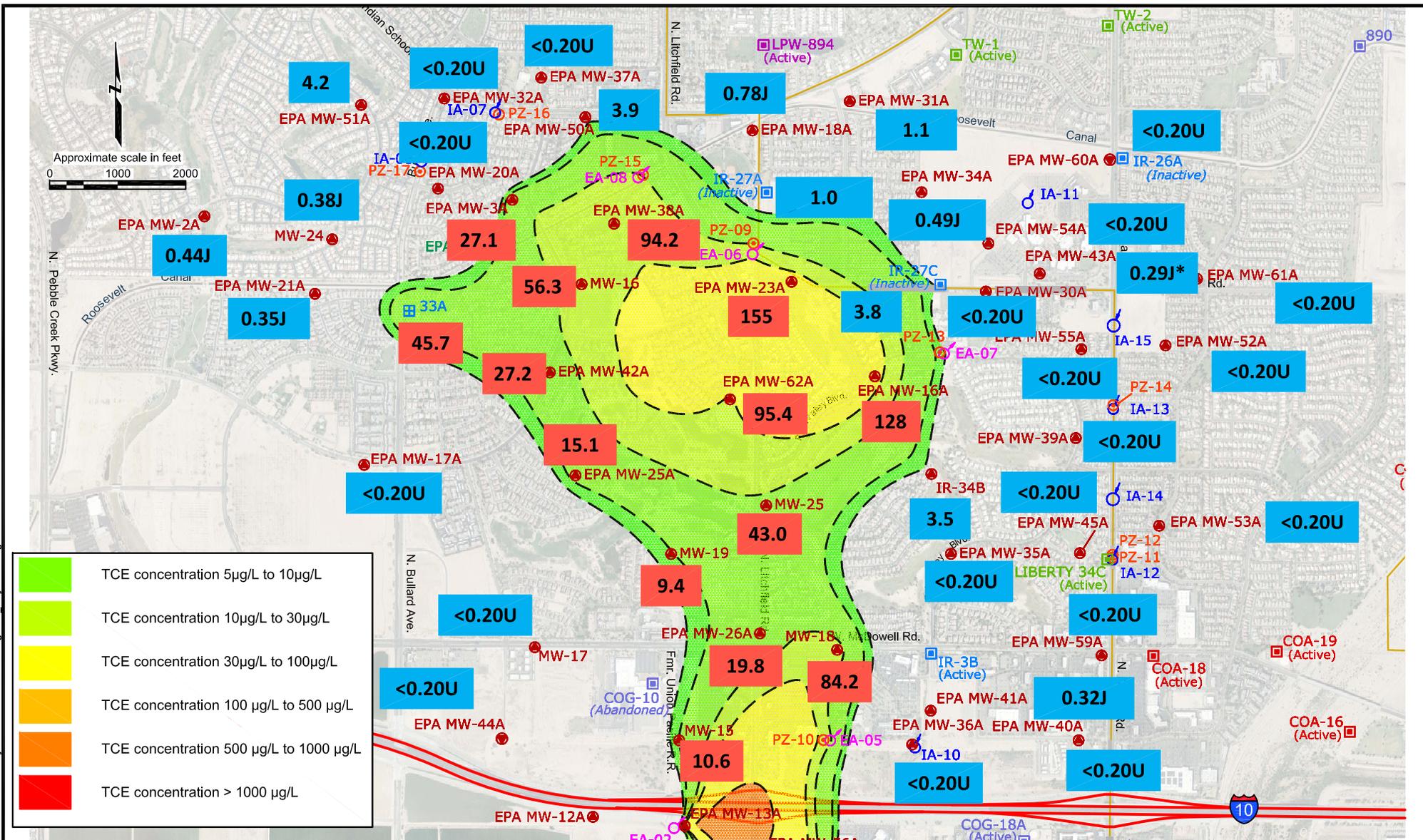
Goodyear, AZ, 85338
P. 623-322-7003
C. 480.322.1474

MATRIX**NEW**WORLD

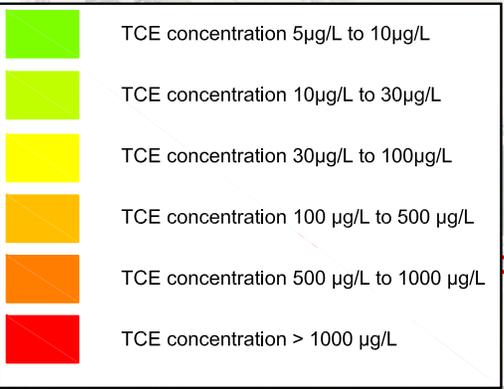
Engineering Progress

www.matrixnewworld.com

Certified WBE, DBE, SBE Business



© MATRIXNEWORLD (P:2015) 15-100 PGA-NorthCAD/City Summaries/05-May/COA-COL/COA-CLP Figure 1 May 2015.dwg



Explanation

— Isocontour showing TCE concentration in µg/L, dashed where inferred. Based on May 2015 data.

0.20U TCE Concentration < 5 µg/L
9.9 TCE Concentration ≥ 5 µg/L

PHOENIX - GOODYEAR AIRPORT - NORTH SUPERFUND SITE
 404 S. LITCHFIELD ROAD GOODYEAR
 MARICOPA COUNTY, ARIZONA

MATRIXNEWORLD
 Engineering Progress

Matrix New World Engineering, Inc.
 250 North Litchfield Road, Suite 201
 Goodyear, Arizona 85338
 WBE / DBE / SBE

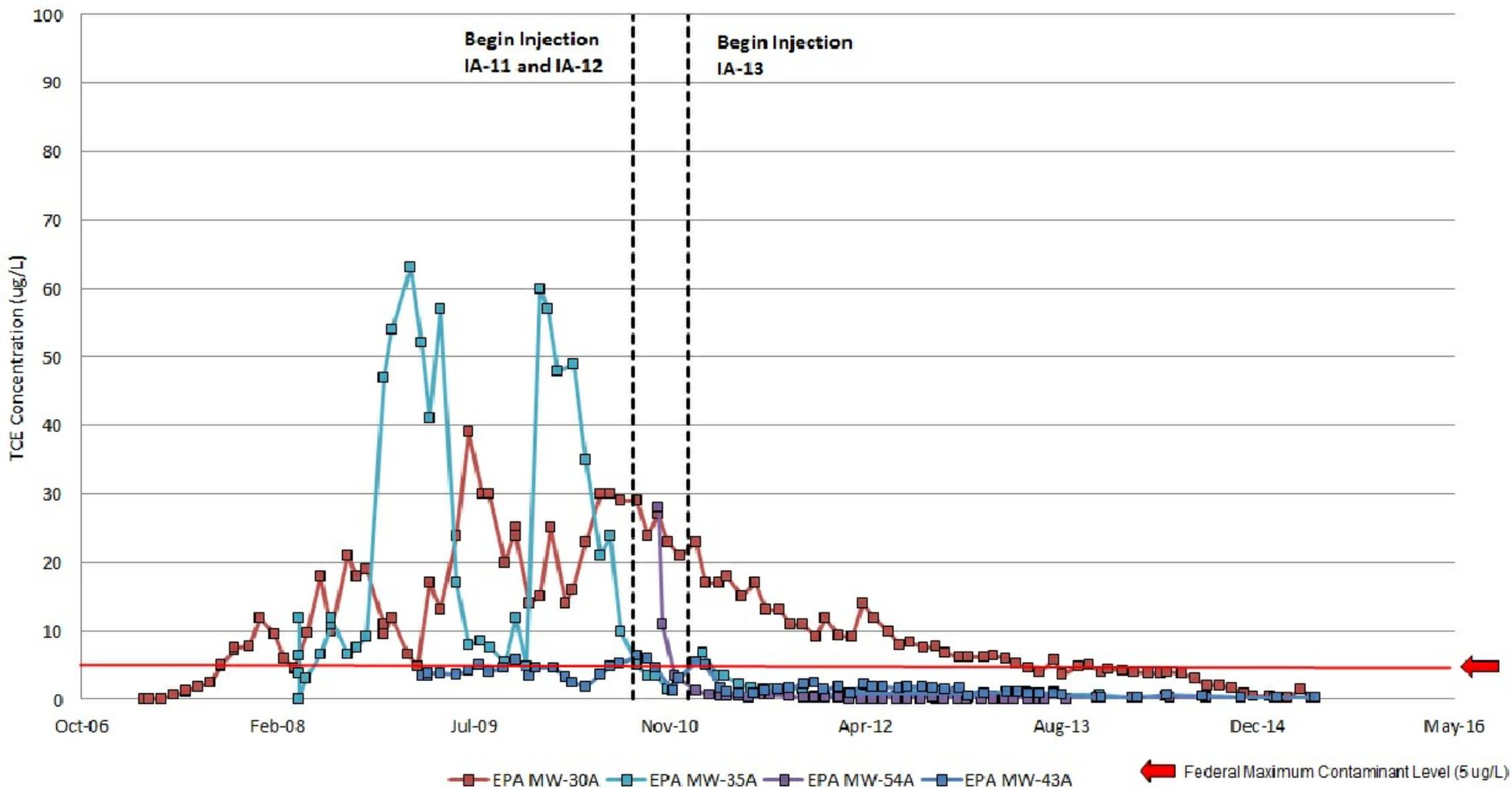
Tel: 623-322-7003
 Fax: 973-240-1818
 www.matrxnewworld.com

**SUBUNIT A TCE CONCENTRATIONS
 NORTH OF I-10
 MAY 2015**

DRAWN BY: AH	DESIGNED BY: AH	APPROVED BY: HB	PROJECT NUMBER: 15-100E
DATE: 06-15-15	DATE: 06-15-15	DATE: 06-15-15	SCALE: 1" = 2000'

FIGURE NUMBER:
1

**TCE Concentrations EPA MW-30A, EPA MW-35A, EPA MW-43A, and EPA MW-54A
Phoenix-Goodyear Airport-North
Goodyear, AZ**



PHOENIX - GOODYEAR AIRPORT - NORTH SUPERFUND SITE
 404 S. LITCHFIELD ROAD GOODYEAR
 MARICOPA COUNTY, ARIZONA

MATRIXNEWORLD
 Engineering Progress

Matrix New World Engineering, Inc.
 250 North Litchfield Road, Suite 201
 Goodyear, Arizona 85338
 WBE / DBE / SBE

Tel: 623-322-7003
 Fax: 973-240-1818
 www.matrixnewworld.com

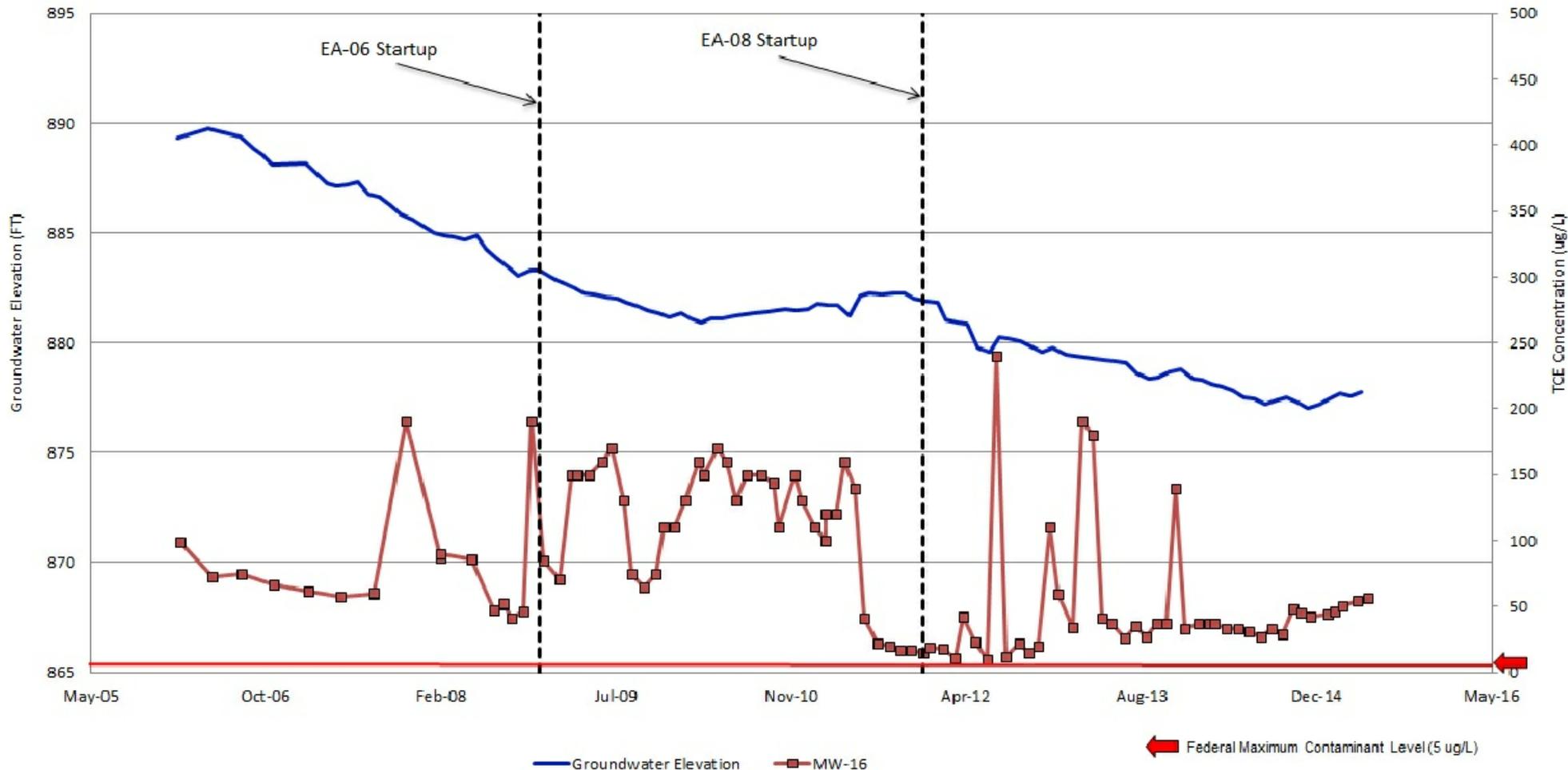
TCE TREND GRAPHS-PERFORMANCE
 MONITOR WELLS - SUBUNIT A
 NORTHEAST AREA

DRAWN BY: AH	DESIGNED BY: AH	APPROVED BY: HB	PROJECT NUMBER: 15-100E
DATE: 6-15-15	DATE: 6-15-15	DATE: 6-15-15	SCALE: NONE

FIGURE NUMBER:

2

MW-16 GROUNDWATER LEVELS and TCE CONCENTRATIONS (2006 - 2015)
Phoenix-Goodyear Airport-North
Goodyear, AZ



© MATRIXNEWORLD (P:2015) 15-100 PGA-NorthCAD:City Summaries(05-May)COA-COLPICDA-CLP Figure 3 May 2015.dwg

PHOENIX - GOODYEAR AIRPORT - NORTH SUPERFUND SITE
 404 S. LITCHFIELD ROAD GOODYEAR
 MARICOPA COUNTY, ARIZONA

MATRIXNEWORLD
 Engineering Progress

Matrix New World Engineering, Inc.
 250 North Litchfield Road, Suite 201
 Goodyear, Arizona 85338
 WBE / DBE / SBE
 Tel: 623-322-7003
 Fax: 973-240-1818
 www.matrixnewworld.com

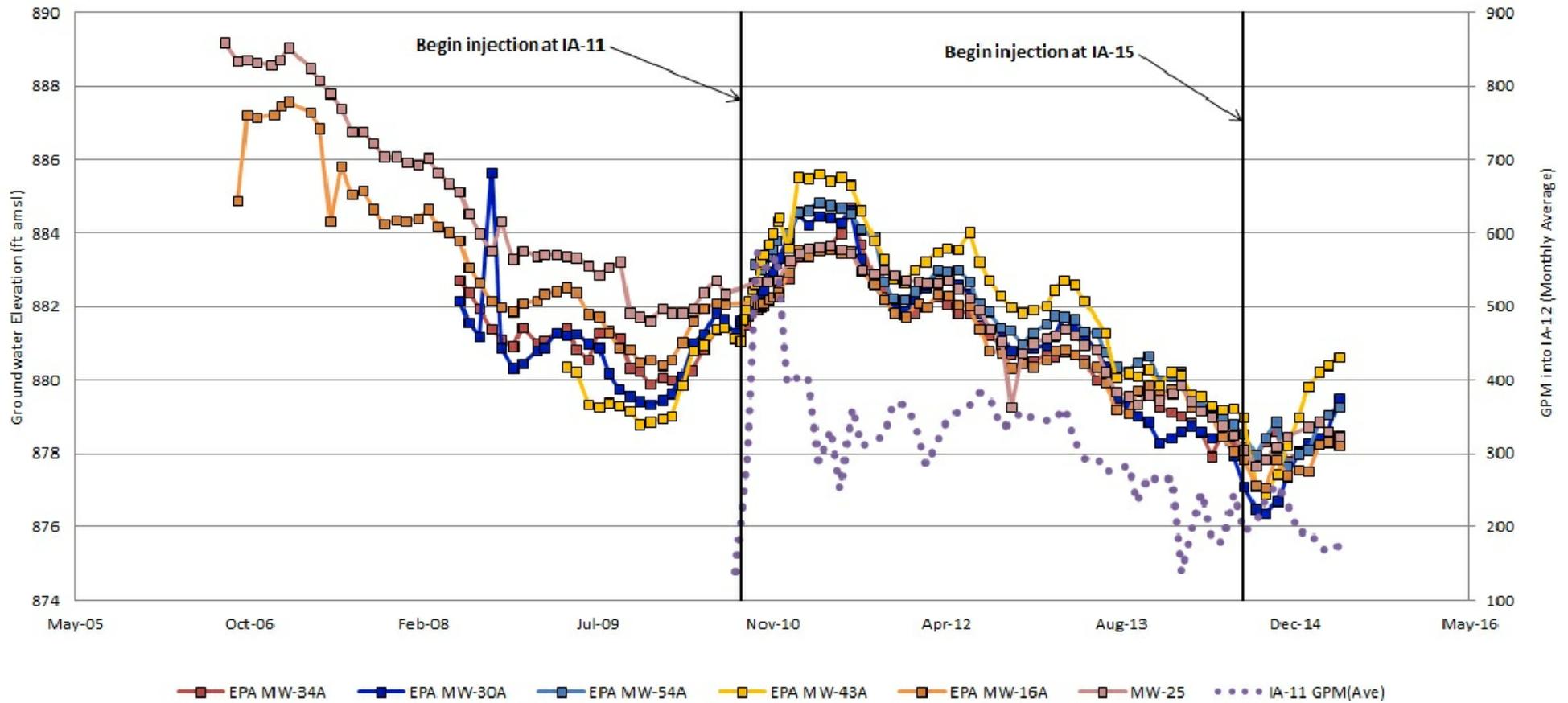
**GROUNDWATER ELEVATION & TCE
 CONCENTRATION TRENDS
 MW-16**

DRAWN BY: AH	DESIGNED BY: AH	APPROVED BY: HB	PROJECT NUMBER: 15-100E
DATE: 6-15-15	DATE: 6-15-15	DATE: 6-15-15	SCALE: NONE

FIGURE NUMBER:

3

Hydrograph - IA-11 Area Wells Phoenix-Goodyear Airport-North Goodyear, AZ



PHOENIX - GOODYEAR AIRPORT - NORTH SUPERFUND SITE
404 S. LITCHFIELD ROAD GOODYEAR
MARICOPA COUNTY, ARIZONA

MATRIX**NEWORLD**
Engineering Progress

Matrix New World Engineering, Inc.
250 North Litchfield Road, Suite 201
Goodyear, Arizona 85338
WBE / DBE / SBE

Tel: 623-322-7003
Fax: 973-240-1818
www.matrixnewworld.com

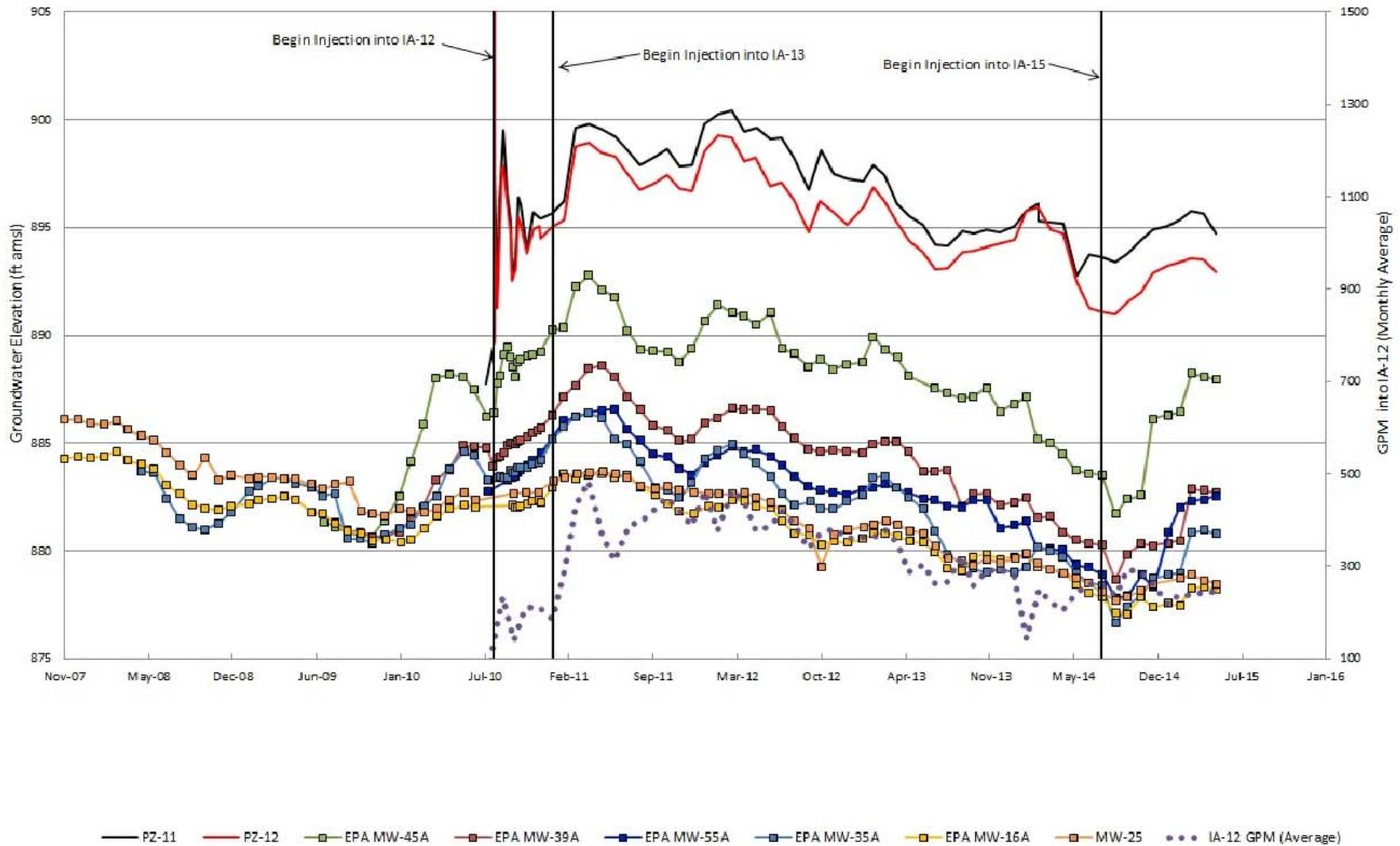
NE AREA SUBUNIT A GROUNDWATER
ELEVATION TRENDS
INJECTION WELL IA-11 AREA

DRAWN BY: AH	DESIGNED BY: LM	APPROVED BY: HB	PROJECT NUMBER: 15-100E
DATE: 6-15-15	DATE: 6-15-15	DATE: 6-15-15	SCALE: NONE

FIGURE NUMBER:

4

Hydrograph - IA-12 and IA-13 Area Wells Phoenix-Goodyear Airport-North Goodyear, AZ



PHOENIX - GOODYEAR AIRPORT - NORTH SUPERFUND SITE
404 S. LITCHFIELD ROAD GOODYEAR
MARICOPA COUNTY, ARIZONA

MATRIX **NEW** WORLD

Engineering Progress

Matrix New World Engineering, Inc.
250 North Litchfield Road, Suite 201
Goodyear, Arizona 85338
WBE / DBE / SBE

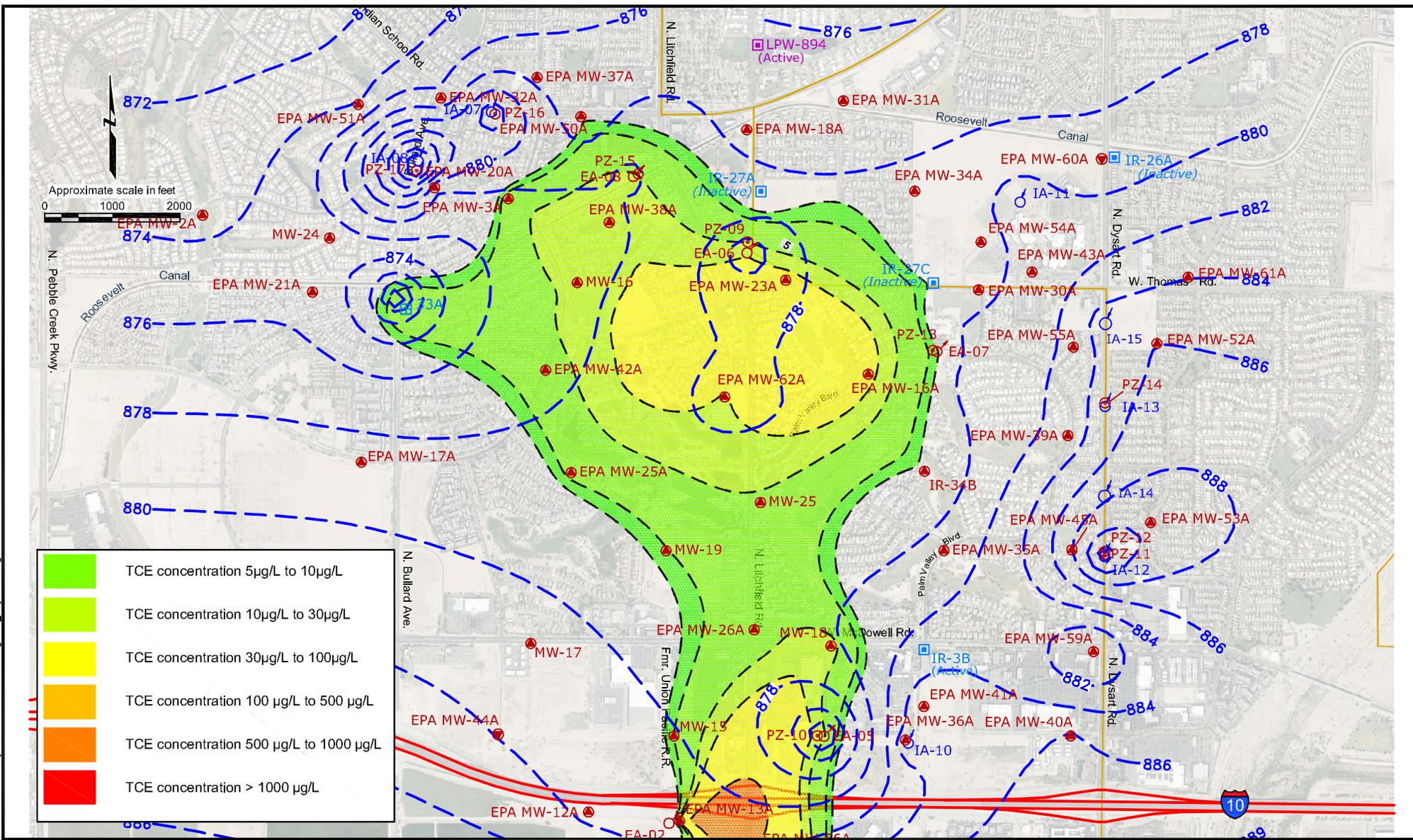
Tel: 623-322-7003
Fax: 973-240-1818
www.matrixnewworld.com

NE AREA SUBUNIT A GROUNDWATER ELEVATION TRENDS INJECTION WELL IA-12 and IA-13 AREA

DRAWN BY: AH	DESIGNED BY: LM	APPROVED BY: HB	PROJECT NUMBER: 15-100E
DATE: 6-15-15	DATE: 6-15-15	DATE: 6-15-15	SCALE: NONE

FIGURE NUMBER:

5



© MATRIXNEWORLD, I:\2015\15-100 PGA-North\CAD\City Summaries\05-May\COA-CO\IP\COA-CLP Figure 6 May 2015.dwg

PHOENIX - GOODYEAR AIRPORT - NORTH SUPERFUND SITE
404 S. LITCHFIELD ROAD GOODYEAR
MARICOPA COUNTY, ARIZONA

MATRIXNEWORLD
Engineering Progress

Matrix New World Engineering, Inc.
250 North Litchfield Road, Suite 201
Goodyear, Arizona 85338
WBE / DBE / SBE

Tel: 623-322-7003
Fax: 973-240-1818
www.matrixnewworld.com

SUBUNIT A GROUNDWATER CONTOURS
AND TCE PLUME NORTH OF I-10
MAY 2015

DRAWN BY: AH	DESIGNED BY: AH	APPROVED BY: HB	PROJECT NUMBER: 15-100E
DATE: 6-15-15	DATE: 6-15-15	DATE: 6-15-15	SCALE: 1" = 200'

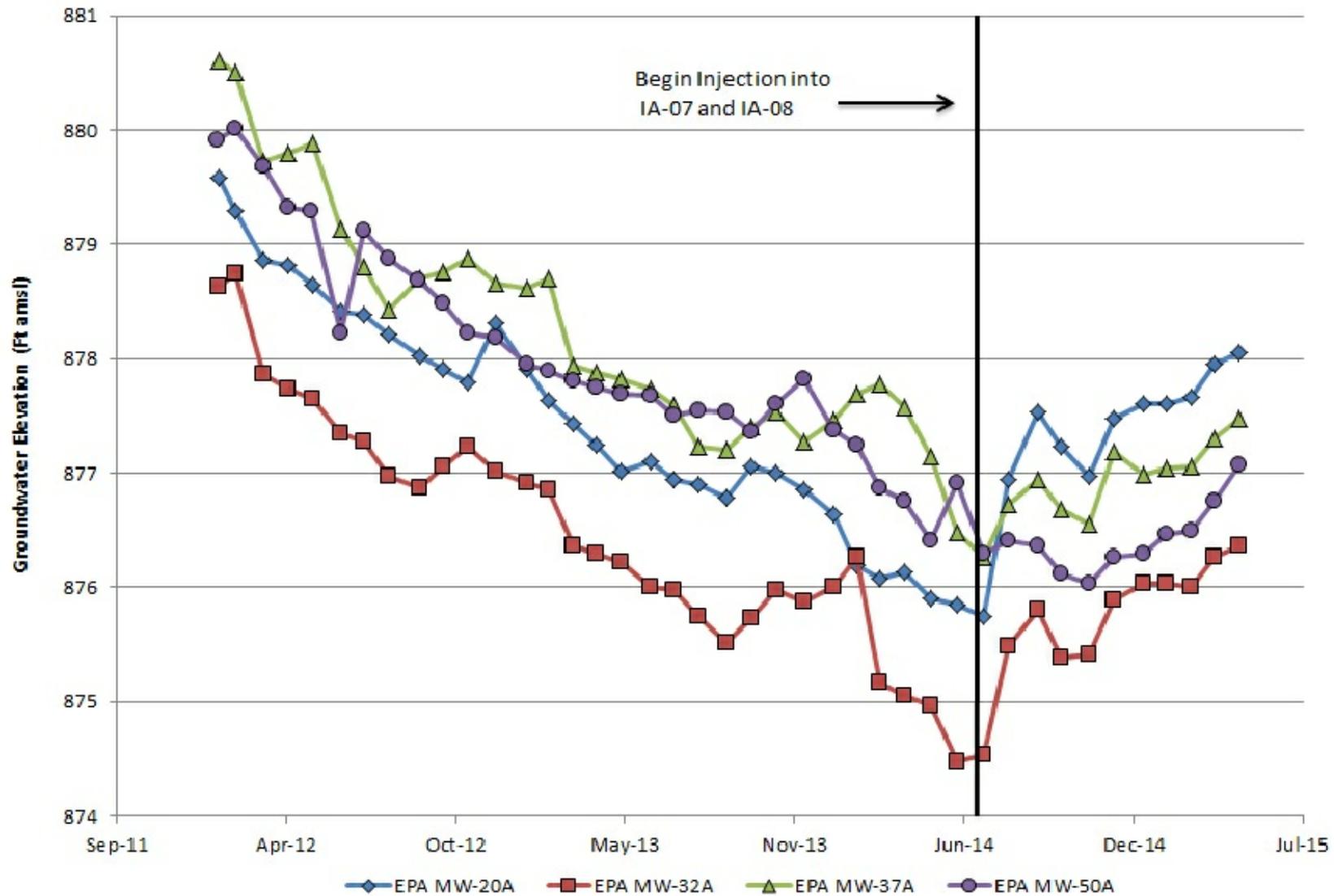
FIGURE NUMBER:

6

Hydrograph- IA-07 and IA-08 Area Wells

Phoenix-Goodyear Airport-North

Goodyear AZ



© MATRIXNEWORLD (P:2015)15-100 PGA-NorthCAD/City Summaries/05-May/COA-COL/ICDA-CLP Figure 7 May 2015.dwg

PHOENIX - GOODYEAR AIRPORT - NORTH SUPERFUND SITE
404 S. LITCHFIELD ROAD GOODYEAR
MARICOPA COUNTY, ARIZONA

MATRIXNEWORLD
Engineering Progress

Matrix New World Engineering, Inc.
250 North Litchfield Road, Suite 201
Goodyear, Arizona 85338
WBE / DBE / SBE
Tel: 623-322-7003
Fax: 973-240-1818
www.matrixnewworld.com

NW AREA SUBUNIT A GROUNDWATER
ELEVATION TRENDS
INJECTION WELL IA-07 and IA-08 AREA

DRAWN BY: AH	DESIGNED BY: LM	APPROVED BY: HB	PROJECT NUMBER: 15-100E
DATE: 6-15-15	DATE: 6-15-15	DATE: 6-15-15	SCALE: NONE

FIGURE NUMBER:

7