



## **Minor Change to the Off-Post Record of Decision for the Off-Post Groundwater Intercept and Treatment System Modification of the Northern Pathway System**

*Fact Sheet*  
February 17, 2021

### ***Purpose of the Fact Sheet***

The purpose of this fact sheet is to document minor changes to the requirements of the Record of Decision (ROD) for the Off-Post Operable Unit (OU) for the Rocky Mountain Arsenal (RMA) (HLA 1995) related to modifications of the Northern Pathway System (NPS). Flow from the NPS extraction system and the First Creek System (FCS) extraction system are currently treated at the Off-Post Groundwater Intercept and Treatment System (OGITS). Changes discussed in this Fact Sheet apply only to the NPS portion of the OGITS system.

This fact sheet documents the installation of additional extraction wells and recharge trenches, abandonment of the original system, and the relocation of groundwater treatment of the NPS flow from the OGITS treatment plant to a new NPS treatment plant. These changes are being made as a supplement to the existing system to ensure groundwater is treated to ROD remediation goals and to relocate groundwater treatment from an expiring land lease area to a new land lease area.

### ***Remediation Framework***

The Off-Post ROD was signed by the U.S. Army (Army), the U.S. Environmental Protection Agency (EPA) and the Colorado Department of Public Health and Environment (CDPHE) on December 19, 1995. The On-Post ROD was signed by the U.S. Army (Army), the U.S. Environmental Protection Agency (EPA) and the Colorado Department of Public Health and Environment (CDPHE) on June 10, 1996, with concurrence from the U.S. Fish and Wildlife Service and Shell Oil Company (Shell). The Army, serving as lead agency, and Shell are implementing the on-post and off-post remedies, which include treatment of contaminated groundwater at multiple systems, including the North Boundary Containment System (NBCS), Northwest Boundary Containment System (NWBCS) and OGITS. The locations of the existing treatment systems are shown on Figure 1.

### ***Summary of Site History and Contamination Issues***

The RMA is a federally owned facility located in Commerce City, Colorado, approximately 10 miles northeast of downtown Denver. Following the attack on Pearl Harbor, the Army established RMA in 1942 to produce chemical warfare agents and incendiary munitions during World War II. Following the war and through the early 1980s, the Army continued to use these facilities for military production and munitions storage and demilitarization. Beginning in 1946, the Army leased some RMA facilities to private companies to manufacture industrial and agricultural chemicals. Shell Oil Company purchased Julius Hyman and Co., the principal lessee, and continued to manufacture primarily pesticides at RMA from 1950 to 1982. Although the Army and Shell used accepted manufacturing and disposal practices of the time, contamination of soil, sediments, structures and groundwater occurred. The principal contaminants include organochlorine pesticides, heavy metals, agent-degradation products and manufacturing by-products, and chlorinated and aromatic solvents.

In 1984, the Army began a systematic investigation of site contamination in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), and the site was placed on the National Priorities List (NPL) in 1987. The NPL is a list of the nation's most contaminated sites, also known as Superfund sites. The RMA was divided into the On-Post OU and Off-Post OU. The On-Post OU addresses contamination within the boundaries of the Arsenal, and the Off-Post OU addresses contamination north and northwest of the Arsenal.

As required by CERCLA, a Remedial Investigation was conducted to determine the nature and extent of contamination in the off-post area (ESE and HLA 1988). The Remedial Investigation identified groundwater as the primary pathway for migration of contamination into the off-post area. An Endangerment Assessment/Feasibility Study (HLA 1992) was conducted for the Off-Post OU leading to the actions required by the Off-Post ROD (HLA 1995). A separate Remedial Investigation/Feasibility Study (Ebasco 1992, FWENC 1995) was conducted for the On-Post OU leading to the actions required by the On-Post ROD (FWENC 1996). Sites that posed potential immediate risks to human health and the environment were addressed through Interim Response Actions.

The remedy selected in the Off-Post ROD consisted primarily of groundwater treatment and exposure control to prevent use of contaminated groundwater. The groundwater remedy, which is ongoing, includes extraction of contaminated groundwater that migrated off post prior to completion of the boundary containment systems, treatment at the OGITS, and reinjection of treated groundwater. Continued operation of the NBCS and NWBCS were identified as part of the off-post remedy, consistent with the remedy selected in the On-Post ROD. Groundwater monitoring continues as part of long-term operations and maintenance. The selected off-post remedy also includes institutional controls to prevent the use of groundwater in which contaminants exceed remediation goals and mapping of groundwater contaminants that exceed containment system remediation goals. The Army also paid to connect residents to treated municipal water supplies. There are no changes to these controls.

Chemicals present in groundwater and treated at the NBCS, NWBCS and OGITS include; volatile halogenated organics, volatile hydrocarbon compounds, volatile aromatic organics,

organochlorine pesticides, diisopropylmethyl phosphonate (DIMP), phosphorous and sulfur-containing organic chemicals, semivolatile halogenated organics and arsenic.

### ***Summary of OGITS and NPS***

The OGITS was originally constructed in 1993 as an Interim Response Action to extract and treat contaminated alluvial groundwater plumes that had migrated north of RMA prior to construction of the North Boundary Containment System. The OGITS treats contaminated groundwater extracted from two systems, the First Creek System and the Northern Pathway System. Both extraction systems are located along Highway 2 north of RMA and the OGITS is located on Peoria Street between 96<sup>th</sup> Avenue and 104<sup>th</sup> Avenue, as shown on Figure 1.

The Off-Post ROD describes the operation of the OGITS as follow:

- Removal of contaminated alluvial groundwater north of the RMA boundary in the First Creek and northern paleochannels, using groundwater extraction wells.
- Treatment of the extracted groundwater, using carbon adsorption.
- Recharge the treated groundwater to the alluvial aquifer using recharge wells and trenches.

The original NPS began operating in 1993 to intercept contaminated groundwater flowing northward in the alluvial aquifer north of the northern boundary of the RMA. The original system consisted of 12 extraction wells, 24 recharge wells, and pipelines for conveyance of extracted groundwater to the OGITS and treated water back to the recharge wells. Between 1993 and 2004, NPS operations significantly reduced both the groundwater contaminant concentrations and the areal extent of groundwater contamination. Consequently, four of the original NPS extraction wells were turned off on July 1, 2004, after meeting ROD shut-off requirements. The current original system configuration is shown on Figure 2.

In 2005, a land development company (Amber Homes, Inc.) proposed several modifications to the original system to accommodate development plans for the property. A conceptual design was prepared that included a new groundwater intercept system upgradient of the original system (George Chadwick Consulting 2005). These additions, termed the Modified NPS, included installation of six new upgradient extraction wells, five new recharge trenches and 24 new monitoring wells. The Modified NPS was installed upgradient of the original system in a narrow easement parallel and adjacent to the railroad tracks near Highway 2. At the time of the construction of the Modified NPS by Amber Homes in 2006, contaminant levels in the “gap” area between 37817 and 37818 were below relevant ROD-identified Containment System Remediation Goals (CSRGs), so no extraction wells were installed in this gap area. In the case of dieldrin, the CSRG (0.002 micrograms per liter, or  $\mu\text{g/L}$ ) was below the Practical Quantitation Limit of 0.05  $\mu\text{g/L}$ , and attainment of the PQL served as attainment of the remediation goal. The plume locations and Modified NPS configuration are shown on Figure 2.

However, in 2012, the dieldrin PQL was lowered from 0.05  $\mu\text{g/L}$  to 0.013  $\mu\text{g/L}$ . Data collected since lowering the dieldrin PQL indicates that several wells within the gap area between extraction wells 37817 and 37818 have contaminant levels that now exceed this lower value.

Based on recently conducted pumping tests, it has been determined that additional extraction wells are necessary to address this gap in the system capture.

In addition, the land lease that was acquired to support extraction and reinjection of water in the original NPS is set to expire in June 2022. For this reason, and due to concerns caused by further land development along the transmission pipeline leading to the OGITS treatment plant, the Army has opted to design and construct a mobile treatment unit at the location of the NPS extraction system instead of conveying contaminated water through a future residential area. This new treatment plant, the Northern Pathway Treatment System (NPTS) plant, will be located within the new lease area that is located close to the alignment of the railroad tracks that run parallel to Highway 2 within the Off-Post OU area.

### **Explanation of Minor Changes to ROD Requirements**

Changes to the Off-Post ROD include revising the Modified NPS and relocation of groundwater treatment from the OGITS to the new NPTS.

The modifications to the NPS include installation of seven extraction wells, three recharge trenches, and a new monitoring well as described in the Northern Pathway System Well Field Upgrades Design Report (Navarro 2020). The new system alignment will capture contaminated groundwater flowing through the gap area in the existing system. The revised system will be fully located within the new lease area located along the railroad tracks west of Highway 2 as shown on Figure 3. Implementation of this system upgrade will allow abandonment of the original system, facilitating land development in that area. Wells in the original system will continue to operate until early 2022; however, they will be shut down and closed prior to the end of the lease on June 30, 2022. Abandonment of the original system will not require compliance with ROD shut-off criteria because the revised system is fully replacing the original system. All components of the new NPTS system, including both new and residual components of the existing system, will trigger ROD shut-off criteria when the system is eventually abandoned. Installation of the new extraction wells and recharge trenches is scheduled to be completed in March 2021.

Treatment of contaminated groundwater will be relocated from the OGITS plant to the new NPTS plant. The NPTS will use carbon adsorption to treat the contaminated groundwater, consistent with the requirements in the Off-Post ROD. Treated groundwater is returned to the NPS recharge trenches for reinjection into the alluvial aquifer. The new NPTS will be located within the new lease area, which will minimize the amount of piping required to transport groundwater to and from the plant. The NPTS will be designed and operated to meet the groundwater containment system remediation goals specified in the ROD for the OGITS. Influent and effluent testing will be conducted during plant start-up to ensure that the containment system remediation goals are being met. Long-term influent and effluent monitoring will be conducted on the same schedule as the OGITS, and results will continue to be reported in quarterly effluent reports. The design for the new treatment building is being prepared and is expected to be finalized in April 2021. Construction of the treatment building is scheduled for completion in July 2021.

Following start-up of the new system, the pipelines between the NPS and OGITS will be plugged and abandoned or removed. Pipelines beneath roadways or railroads will be plugged and abandoned. Other pipelines not already removed by the developer will be removed by the Army.

System performance monitoring will continue as detailed in the *Long-Term Monitoring Plan for Groundwater and Surface Water* (LTMP) (TtEC and URS 2010). However, because the existing downgradient performance monitoring wells are located in the expiring lease area, the monitoring network might need to be revised if monitoring well access cannot be maintained. The Army will maintain access to these wells through lease or easement or develop a revised monitoring network plan prior to lease expiration in June 2022.

These changes to the off-post remedy entail revisions to the NPS portion of the remedy. However, the overall remediation goals and operational requirements remain unchanged.

### ***Cost***

Total project cost for the NPTS is estimated at \$2.89 million. Project cost does not include abandonment of original system extraction and recharge wells, which will occur at a later date after the new NPTS is operational. Operational costs for the new NPTS are likely to be slightly less than the NPS portion of the OGITS operational cost due to the proximity of the treatment building to the extraction and recharge system, and efficiency of the updated system.

Long-term monitoring costs are not anticipated to increase, as there will be no significant change between the current NPS monitoring and the monitoring to be conducted after NPTS completion. Compliance and performance monitoring will continue as required by the LTMP. The Army is responsible for implementation and operation of the modified NPTS and bearing the associated costs.

### **Public Participation**

The documents that support the change described here are part of the Administrative Record and are available at the Joint Administrative Record and Document Facility (JARDF). Primary documents include the *Northern Pathway System Well Field Upgrades Design Report* (Navarro 2020) and the *Off-Post Groundwater Treatment System Northern Pathway Treatment Plant Design* (currently draft with final expected April 2021). Please call (303)289-0300 to schedule an appointment to visit the JARDF. These design documents are also provided on the RMA website at [www.rma.army.mil](http://www.rma.army.mil). Site information is also available at the EPA Superfund Record Center located at 1595 Wynkoop Street, Denver, CO 80202. To request copies of the administrative record call 800-227-8917 ext. 312-7273 (toll free). By appointment only.

### ***Information Contacts***

- U.S. Army Public Relations Office  
Patty Lee  
Rocky Mountain Arsenal, Building 129  
Commerce City, CO 80022  
(303) 289-0300

- Rocky Mountain Arsenal Website and Community Information Line [www.rma.army.mil](http://www.rma.army.mil)  
(303) 289-0300
- U.S. Environmental Protection Agency  
Sai Appaji  
Remedial Project Manager  
(303) 312-6313
- Colorado Department of Public Health & Environment  
Susan Newton  
State Project Officer  
(303) 692-3321

***Document Locations***

- Joint Administrative Record and Document Facility (JARDF)  
Rocky Mountain Arsenal, Building 129  
Commerce City, Colorado 80022  
Monday – Friday 12 – 4 p.m. or by appointment (303) 289-0300
- EPA Superfund Records Center  
1595 Wynkoop Street  
Denver, CO 80202  
(800) 227-8917 ext 312-7273  
Monday – Friday 8 a.m. – 4 p.m.

***References***

ESE and HLA (Environmental Science and Engineering, Inc. and Harding Lawson Associates)

- 1988 (Dec.) *Offpost Operable Unit Remedial Investigation and Chemical Specific Applicable or Relevant and Appropriate Requirements, Final Report.* Version 3.1.

Foster Wheeler (Foster Wheeler Environmental Corporation)

- 1996 (June) *Record of Decision for the On-Post Operable Unit.* Version 3.1.

George Chadwick Consulting

- 2005 (May) *Intermediate Conceptual Design of Proposed Modifications to the Northern Pathway Portion of the Off-Post Groundwater Intercept and Treatment System.* Submitted to the Remediation Venture Office. Prepared by George Chadwick Consulting.

HLA (Harding Lawson Associates)

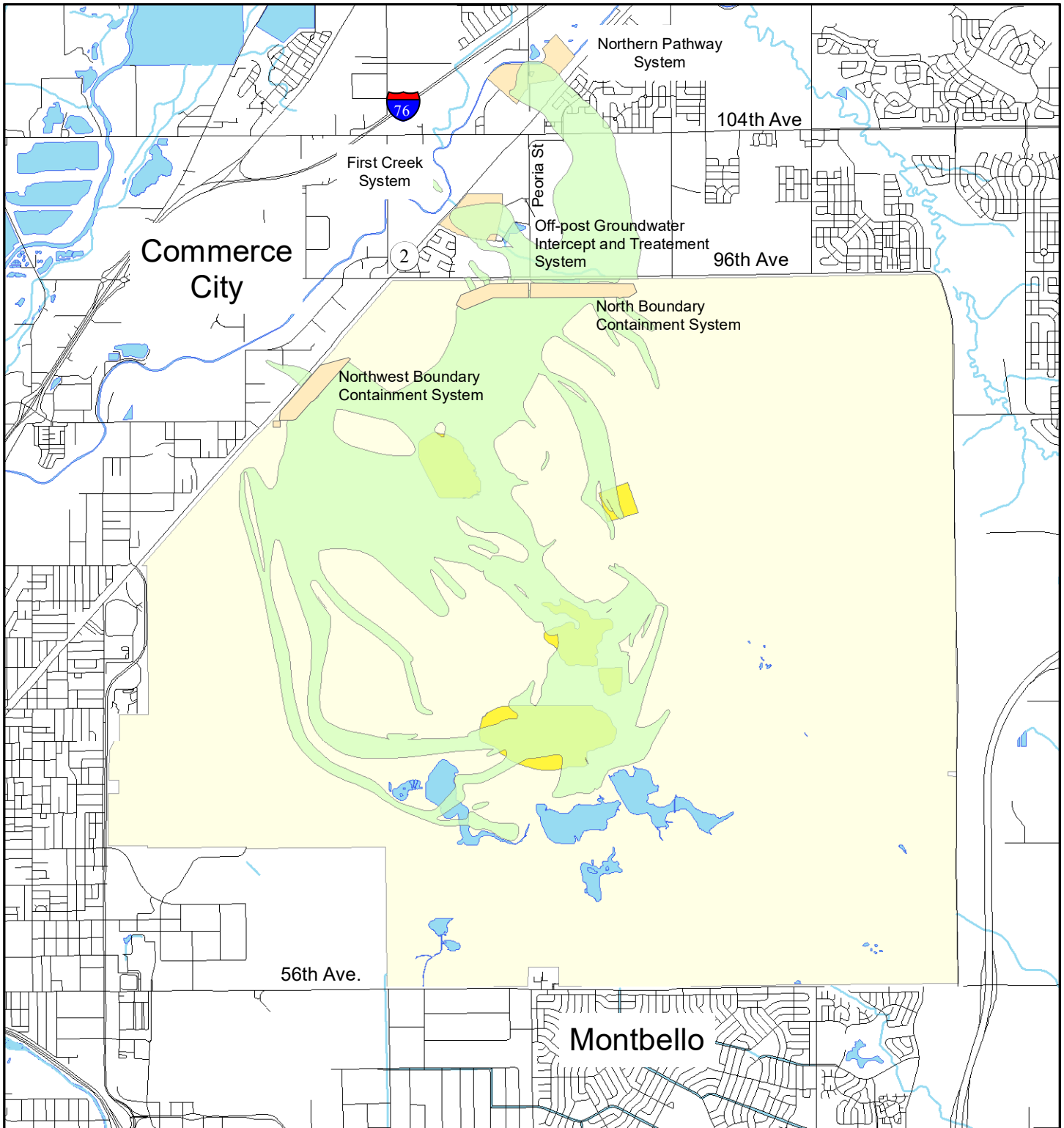
- 1995 (Dec.) *Rocky Mountain Arsenal Off-Post Operable Unit Final Record of Decision, Rocky Mountain Arsenal, Commerce City, Colorado.*

Navarro (Navarro Research and Engineering, Inc.)






2020 (Dec. 2) *Northern Pathway System Well Field Upgrades Design Report. Revision 0.*

TtEC and URS (Tetra Tech EC, Inc. and URS Corporation)

2010 (Mar.) *Long-Term Monitoring Plan for Groundwater and Surface Water.*



**Legend**

-  Groundwater Contaminant Plume Extent
-  Roads
-  Bodies of Water
-  Former Manufacturing or Waste Disposal Areas
-  Rocky Mountain Arsenal / RMA National Wildlife Refuge



NAD27-NGVD29 Datum, US Survey Feet,  
Colorado North Zone  
Sources: U.S. Army, RMA GIS, OMC, Shell/AECOM

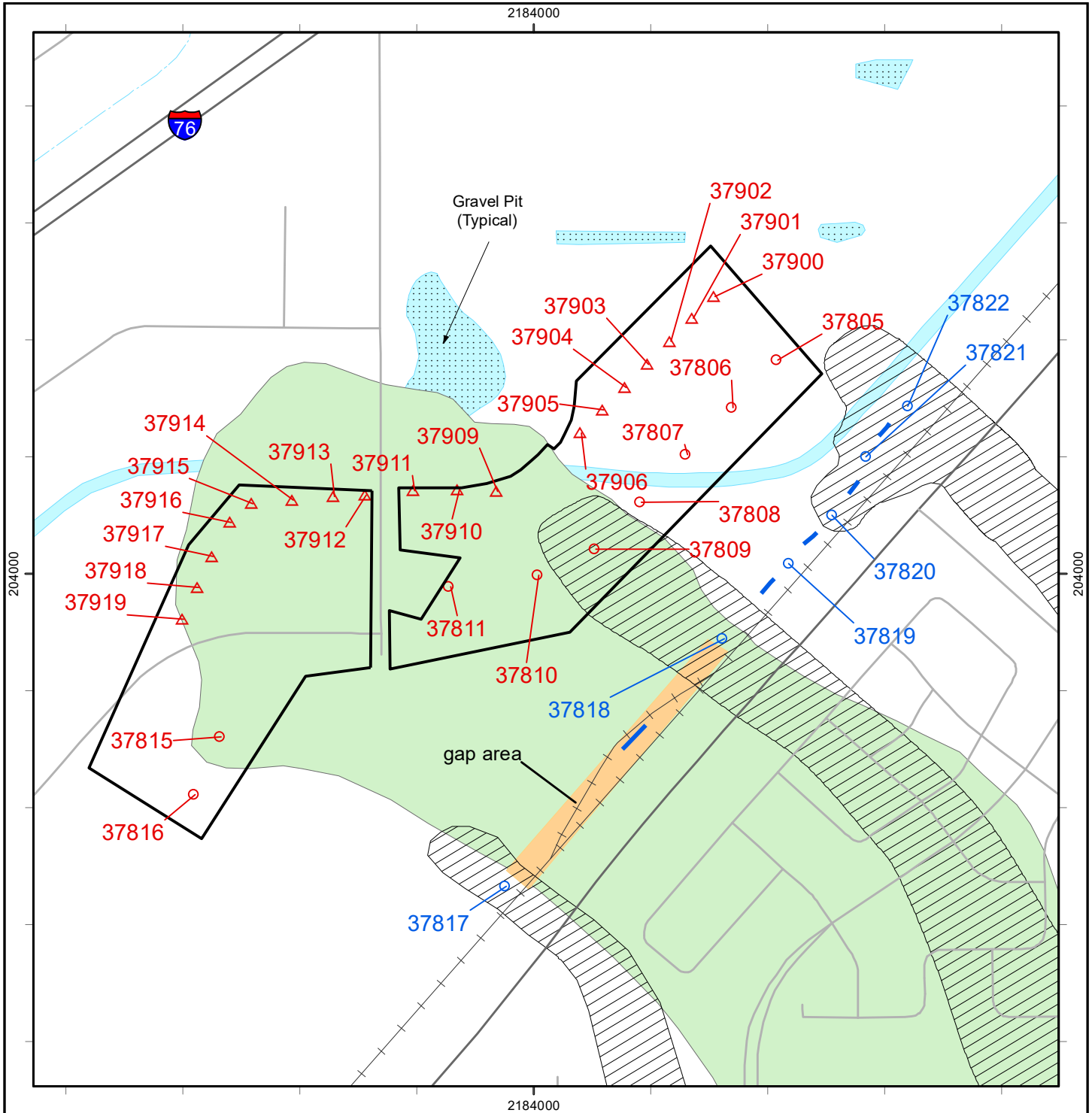


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**Figure 1**

**Groundwater Treatment System Locations**





**Legend**

- Modified Northern Pathway System Extraction Well
- Original Northern Pathway System Extraction Well
- Original Northern Pathway System Recharge Well
- Modified Northern Pathway System Recharge Trench
- Original System Lease Area, Expiring June 2022
- 2009 Composite Plume
- 2019 Dieldrin Plume Extent

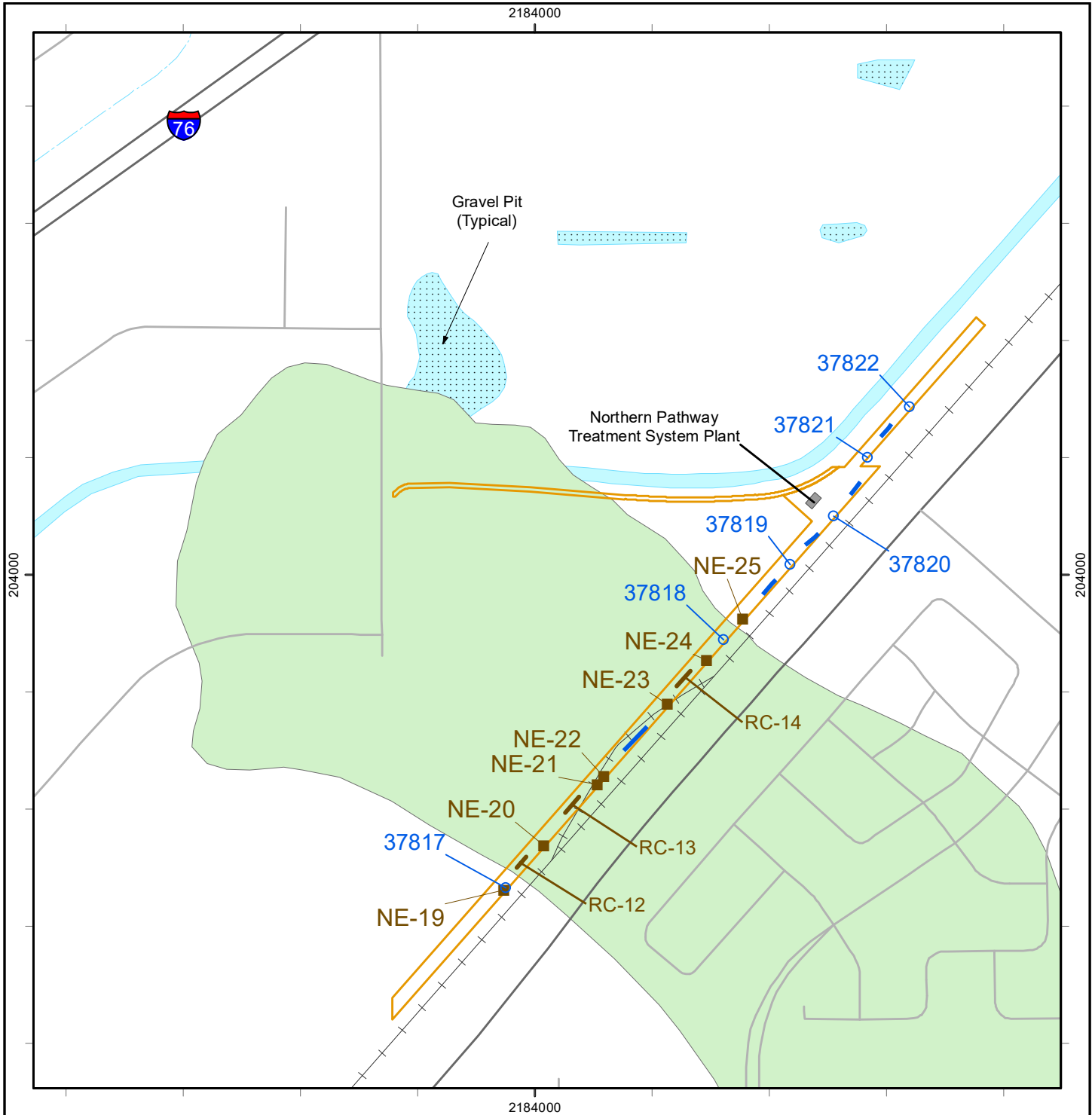


NAD27-NGVD29 Datum, US Survey Feet,  
Colorado North Zone  
Sources: U.S. Army, RMA GIS, OMC, Shell/AECOM



**Figure 2**

**Existing Northern Pathway System**



**Legend**

- Modified Northern Pathway System Extraction Well (Open Well)
- Proposed Extraction Wells
- Existing Northern Pathway System Recharge Trench
- Proposed Recharge Trench
- New Lease Boundary
- Proposed Treatment Plant
- 2019 Dieldrin Plume Extent



NAD27-NGVD29 Datum, US Survey Feet,  
Colorado North Zone  
Sources: U.S. Army, RMA GIS, OMC, Shell/AECOM



**Figure 3**  
**Modified Northern Pathway System**