

**FIFTH FIVE-YEAR REVIEW REPORT FOR  
FOREST GLEN MOBILE HOME SUBDIVISION SUPERFUND SITE  
NIAGARA FALLS, NEW YORK**



**Prepared by**

**U.S. Environmental Protection Agency  
Region 2  
New York, New York**

A handwritten signature in black ink, appearing to read "A. Carpenter", is written over a horizontal dashed line.

**Angela Carpenter, Acting Division Director  
Emergency and Remedial Response Division**

The date "9.27.17" is handwritten in black ink above a horizontal dashed line.

**Date**

## Table of Contents

LIST OF ABBREVIATIONS & ACRONYMS .....	2
I. INTRODUCTION .....	3
Site Background.....	3
FIVE-YEAR REVIEW SUMMARY FORM.....	4
II. RESPONSE ACTION SUMMARY .....	4
Basis for Taking Action.....	4
Response Actions.....	5
Site Redevelopment .....	9
IC Summary Table.....	9
Systems Operations/Operation & Maintenance (O&M).....	9
III. PROGRESS SINCE THE LAST REVIEW .....	10
IV. FIVE-YEAR REVIEW PROCESS .....	11
Community Notification, Involvement & Site Interviews.....	11
Data Review .....	11
Site Inspection.....	14
V. TECHNICAL ASSESSMENT .....	14
QUESTION A: <i>Is the remedy functioning as intended by the decision documents?</i> .....	14
QUESTION B: <i>Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?</i> .....	15
QUESTION C: <i>Has any other information come to light that could call into question the protectiveness of the remedy?</i> .....	16
VI. ISSUES/RECOMMENDATIONS .....	16
VII. PROTECTIVENESS STATEMENT .....	16
VIII. NEXT REVIEW .....	17
APPENDICES .....	18
APPENDIX 1: DOCUMENTS REVIEWED FOR FIFTH FIVE-YEAR REVIEW .....	19
APPENDIX 2: CHRONOLOGY OF EVENTS .....	20

## **LIST OF ABBREVIATIONS & ACRONYMS**

ARAR	Applicable or Relevant and Appropriate Requirement
ATSDR	Agency for Toxic Substances and Disease Registry
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
EPA	United States Environmental Protection Agency
FS	Feasibility Study
GPM	Gallon Per Minute
IRIS	Integrated Risk Information System
LDPE	Low-Density Polyethylene
MCL	Maximum Contaminant Level
MNA	Monitored Natural Attenuation
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
OBG	O'Brien and Gere, Inc.
O&M	Operation and Maintenance
OU	Operable Unit
PAH	Polycyclic Aromatic Hydrocarbon
RAO	Remedial Action Objective
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
SVOC	Semi-Volatile Organic Compound
VC	Vinyl Chloride
VOC	Volatile Organic Compound

## **I. INTRODUCTION**

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP)(40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the fifth FYR for the Forest Glen Mobile Home Subdivision Superfund Site. The triggering action for this statutory review is the completion of the fourth FYR, September 27, 2012. The FYR has been prepared because hazardous substances, pollutants or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of multiple Operable Units (OUs). OU1 is the relocation of the residents of the former Forest Glen Subdivision, OU2 is the contaminated soil, and OU3 is the contaminated groundwater. OU2 and OU3 are being reviewed in this FYR.

The Forest Glen Mobile Home Subdivision Superfund Site FYR was led by Gloria M. Sosa, the EPA Remedial Project Manager (RPM). Participants included Sharissa Singh (Hydrogeologist), Nick Mazziotta (Human Health Risk Assessor), Michael J. Basile (Community Involvement Coordinator), and Pietro Mannino (Western New York Remediation Section Chief). The review began on February 13, 2017.

### **Site Background**

The 39-acre Site, located in both the Town of Niagara and the City of Niagara Falls, Niagara County, New York, is bounded by Service Road, I-190, Expressway Village mobile home subdivision, and the Conrail-Foote Railroad Yard. The Site is bisected by East Gill Creek, a narrow, low-flowing creek. The former 15-acre Forest Glen Subdivision, which once consisted of 51 mobile and two permanent residences, was located south of the creek. There are approximately 6 acres of undeveloped land south of the creek, an 18-acre parcel of undeveloped land north of the creek, including a 1.5-acre wooded wetland. The Site is located in an area zoned for mixed residential, commercial and industrial use. The zoning of the Site property is commercial/industrial. A municipal water system serves the City of Niagara Falls and the Town of Niagara.

## **FIVE-YEAR REVIEW SUMMARY FORM**

<b>SITE IDENTIFICATION</b>		
<b>Site Name:</b> Forest Glen Mobile Home Subdivision Superfund Site		
<b>EPA ID:</b> NYD981560923		
<b>Region:</b> 2	<b>State:</b> NY	<b>City/County:</b> Niagara
<b>SITE STATUS</b>		
<b>NPL Status:</b> Final		
<b>Multiple OUs?</b> Yes	<b>Has the site achieved construction completion?</b> Yes	
<b>REVIEW STATUS</b>		
<b>Lead agency:</b> EPA <i>[If "Other Federal Agency", enter Agency name]:</i>		
<b>Author name (Federal or State Project Manager):</b> Gloria M. Sosa		
<b>Author affiliation:</b> EPA		
<b>Review period:</b> 9/27/2012 - 9/27/2017		
<b>Date of site inspection:</b> 5/31/2017		
<b>Type of review:</b> Statutory		
<b>Review number:</b> 5		
<b>Triggering action date:</b> 9/27/2012		
<b>Due date (five years after triggering action date):</b> 9/27/2017		

## **II. RESPONSE ACTION SUMMARY**

### **Basis for Taking Action**

In 1980, the Niagara County Health Department detected phenolic resins, polyvinyl chloride resins, rubber by-products, and ash in soil. Concrete refuse and industrial machinery were scattered throughout the 21 acres, with concentrated areas in the Carrie Drive and Lisa Lane cul-de-sac. This discovery eventually led to the placement of the Site on the National Priorities List in 1989.

After the relocation of residents was completed in 1992, EPA conducted a Remedial Investigation and Feasibility Study (RI/FS) at the Site from 1994 to 1997. Environmental sampling of soil, sediment and groundwater was performed. The analyses of these samples detected volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) and metals. The contaminants of concern were

benzo(a)pyrene, vinyl chloride, aniline, phenyl isothiocyanate, diphenylamine, 2-mercaptobenzothiazole, 2-anilinobenzothiazole, perylene, n,n-diphenyl-1,4-benzenediamine, phenothiazine, and benzothiazole.

The results of the RI/FS also indicated that the groundwater was contaminated with VOCs and inorganics, however, SVOCs were not detected in the groundwater. VOCs were consistently detected in the monitoring wells downgradient of the fill areas at concentrations exceeding federal drinking water standards. The VOCs detected in groundwater included vinyl chloride. The inorganic compounds included chromium, nickel and lead, which exceeded federal drinking water standards.

A risk assessment was performed as part of the RI/FS and several potential exposure pathways were evaluated. A risk assessment for the Site was performed based on the assumption of a residential land-use scenario since the subdivision and other portions of the Site were zoned residential until 1998.

The risk assessment concluded that teenage trespassers were not at risk from potential contact with contamination in Site media. However, the risk assessment concluded that potential future residents would be at risk from exposure to Site soil and from ingestion of Site groundwater. In addition, an ecological risk assessment was conducted which concluded that ecological receptors at the bottom of the food chain, such as the short-tail shrew, were at risk from exposure to Site media.

## **Response Actions**

EPA initiated a removal action at the Site in April 1989 which included voluntary temporary relocation of residents, the placement of a temporary cover over portions of the Site, fence installation and the off-site disposal of drums.

On July 31, 1989, the Agency for Toxic Substances and Disease Registry (ATSDR) determined that there was a significant risk to human health for persons living at the Site and issued a health advisory recommending the immediate relocation of residents living at the Site.

On July 26, 1989, EPA, through an interagency agreement with the Federal Emergency Management Agency, began a removal action for the temporary relocation of residents from the Forest Glen Subdivision. This removal action was completed in December 1989.

### **OU1 – Relocation**

EPA issued a Record of Decision (ROD) for OU1 in December 1989 selecting permanent relocation of the residents of the Forest Glen Subdivision. EPA completed the permanent relocation of residents in 1992.

This OU will not be evaluated in this FYR.

### **OU2 – Contaminated Soil and Sediment**

EPA issued a ROD for OU2 on March 31, 1998.

The Remedial Action Objectives (RAOs) for soil and sediment are:

- Prevent human contact with contaminated soils, sediments, and groundwater;
- Prevent ecological contact with contaminated soils and sediments;
- Mitigate the migration of contaminants from soils/fill to groundwater.

The components of the soil and sediment remedy included:

- Excavation of contaminated soils from the southern portion of the Site, and contaminated sediment from East Gill Creek, and consolidation of these materials in the northern portion of the site followed by grading in preparation for placement of the cap.
- Confirmatory sampling of the bottom and sidewalls of the excavation to ensure that cleanup goals have been met followed by backfilling with clean fill overlain with a six-inch layer of clean topsoil and grass cover.
- Construction of an 8.5-acre cap over the consolidated soils in the northern portion of the Site in conformance with the major elements described in 6 New York Code of Rules and Regulations Part 360 for solid waste landfill caps. Conceptually, the cap will be comprised of: 18 inches of clay or a suitable material to ensure a permeability of 10<sup>-7</sup> cm/sec, six inches of porous material serving as a drainage layer, 18 inches of backfill, and 6 inches of topsoil and grass cover.
- Implementation of a long-term inspection and maintenance program to ensure cap integrity.
- Removal and off-site disposal of the vacant trailers and two permanent homes to facilitate the excavation of soils.
- Capping the Wooded Wetland with six inches of clean sediment. If further studies conclude that the addition of six inches of clean sediment would have an adverse impact on the wetland, contamination in the Wooded Wetland would be excavated and the Wooded Wetland would be appropriately restored.
- Performance of a wetlands assessment and mitigation plan during the remedial design phase in order to minimize potential adverse impacts to the wetland and to replace any wetlands lost due to the remediation.
- Compliance with all ARARs, including the location-specific ARARs identified in the ROD. This will include the performance of a Stage IB cultural resources survey and a floodplain assessment.
- Taking measures to secure institutional controls to limit future activities in the Northern Aspect and fencing to limit future access to the capped area.

In September 1999, EPA issued a ROD for OU3, selecting groundwater extraction and off-site treatment as the remedy for the contaminated groundwater. The OU3 ROD also amended the OU2 ROD for contaminated soils and sediments. The main change to the soil remedy resulted from the City of Niagara Falls and the Town of Niagara rezoning the Site property from residential to commercial/light industrial use.

The components of the amended soil and sediment remedy include:

- Construction of an engineered cover system (landfill cap) over the contaminated soils/sediment at the Site in conformance with the major elements described in 6 New York Code of Rules and Regulations Part 360 for landfill caps. Conceptually, the standard Part 360 cap includes 18 inches of low-permeability soil cover barrier or geomembrane to ensure a permeability of 10<sup>-7</sup> centimeters/second, six inches of porous material serving as a drainage layer, 24 inches of soil as a barrier protection layer and six inches of topsoil and grass cover. The areas of the Site to be capped include the berm and the portions of contaminated soil (above Technical Administrative Guidance Memoranda (TAGMs)) in the former Subdivision and Edgewood Drive Wooded Lots.

Areas of contaminated soil (above TAGMs) located in the Northern Aspect will be excavated and consolidated under the cap, as well as contaminated sediments excavated along East Gill Creek;

- Implementation of a long-term inspection and maintenance program to ensure cap integrity;
- Removal and off-site disposal of the vacant trailers and two permanent homes to prepare the Site for excavation and capping;
- Taking measures to secure institutional controls in the form of deed restrictions to limit future Site activities, as appropriate, and fencing to limit future access to the capped area;
- Capping the Wooded Wetland with six inches of clean sediment. If the Wetlands Assessment and Mitigation Plan conclude that the addition of six inches of clean sediment would have an adverse impact on the wetland, contamination in the Wooded Wetland would be excavated and the area would be appropriately restored; and,
- Performance of an investigation in East Gill Creek during Remedial Design to determine if there are upstream sources of contamination that may impact the Site.

### OU3 – Contaminated Groundwater

The September 30, 1999 ROD also selected a remedy for contaminated groundwater.

The RAOs for groundwater are:

- Reduce or eliminate the threat to human health and the environment posed by ground-water contamination by remediating ground water to MCLs, thereby restoring the aquifer to beneficial uses; and,
- Reduce or eliminate the potential for migration of contaminants to potential receptors.

The major components of the groundwater remedy include:

- Extraction of contaminated groundwater from the on property plume;
- Transportation of the extracted groundwater via sanitary sewer to the City of Niagara Falls Wastewater Treatment Plant;
- Construction of an on-site, 12-hour holding tank, as required by the City of Niagara Falls Wastewater Treatment Plant;
- Sampling of the storage tank effluent as required by the City of Niagara Falls Wastewater Treatment Plant; and,
- Implementation of a Long-Term Groundwater Monitoring Program to assess whether the remedy is functioning as designed; and,
- Performance of a Monitored Natural Attenuation Study, including a baseline investigation and groundwater modeling, to evaluate intrinsic biodegradation and other natural attenuation processes. If monitoring indicates that natural attenuation is not effective in remediating the off-property groundwater contamination, active remedial measures will be considered.



## **Status of Implementation**

### **Soil Remediation**

The Goodyear Tire & Rubber Company, Inc., (Goodyear) entered into a Consent Decree with EPA in 2001 to perform the remedial design and remedial action for both soil and groundwater at the Site. EPA approved the remedial design for soil in July 2002.

In September 2002, approximately 43 tons of asbestos-containing materials were removed from the Site and disposed of at the BFI special waste landfill in Kenmore, New York. Subsequent to the removal of the asbestos, the trailers and two permanent homes were demolished. Approximately one ton of demolition debris, excluding the metal trailer frames which were recycled, was disposed of at the BFI Pine Avenue Landfill in Niagara Falls.

Goodyear excavated approximately 43,000 cubic yards of contaminated soil and sediment and consolidated this material in the northern half of the former subdivision. Approximately 4.5 tons of waste containing polyaromatic hydrocarbons (PAHs) were removed and disposed off-Site. Verification sampling indicates that the action levels set forth in the 1999 ROD had been achieved.

As required by the 1999 ROD in order to maintain the grade at the Site, Goodyear excavated the Wooded Wetland to a depth of six inches. Goodyear excavated approximately 1,000 cubic yards of sediment and consolidated it in the area which was subsequently capped. Six inches of topsoil were imported to the Site and the wetland was restored according to the Wetlands Mitigation Plan. In addition, approximately 3.5 acres of wetland at the Site were restored and/or enhanced utilizing hydrophilic plant species.

The excavation of contaminated sediment along East Gill Creek varied between 6 and 12 inches. Approximately 1,000 cubic yards of sediment were excavated and consolidated in the area which was subsequently capped. Goodyear constructed a Part 360 cap that consisted of a polypropylene nonwoven geotextile filter fabric and a 40-mil linear low-density polyethylene (LDPE) liner.

The barrier protection layer encompasses an area of approximately nine acres and supports several distinct regions, including a vegetated area, a one-story commercial/light-industrial building, a heavy-duty asphalt area and a standard asphalt area.

### **Groundwater Remediation**

Goodyear installed and developed the two groundwater extraction wells. The remedial design indicated that groundwater would be recovered from each extraction well at a flow rate of 10 gallons per minute (gpm) for a combined discharge rate of 20 gpm, under normal pumping circumstances.

Goodyear brought the groundwater remedial system on-line in September 2003. The two extraction wells are pumped at a combined rate of 20 gpm. Water-level mapping indicated that the area of capture of the groundwater remedial system is of sufficient size to capture the on property groundwater plume.

An additional extraction well was added to the system in August 2014 in order to prevent any migration of contaminants by providing additional hydraulic capture. RW-3 currently pumps at a rate of 10 gpm and

RW-1 and RW-2 each pump at 5 gpm, for a combined pumping rate of 20 gpm. Goodyear is currently optimizing the pumping rates for the extraction wells.

EPA approved a monitored natural attenuation (MNA) Study in 2001; the study determined that the conditions in the aquifer are such that the contaminants in the off-property plume are naturally attenuating.

### **Site Redevelopment**

As part of the soil remediation, Goodyear constructed a 40,000-square-foot slab-on-grade building on the Part 360 cap. The Cherokee Development Corporation leases the building long term to the KP Corporation which maintains a warehouse at this location.

### **IC Summary Table**

**Table 1:** Summary of Planned and/or Implemented ICs

<b>Media, engineered controls, and areas that do not support UU/UE based on current conditions</b>	<b>ICs Needed</b>	<b>ICs Called for in the Decision Documents</b>	<b>Impacted Parcel(s)</b>	<b>IC Objective</b>	<b>Title of IC Instrument Implemented and Date (or planned)</b>
groundwater, soils, sediments	Yes	Yes	entire Site	Use restriction on site activities to preserve integrity of the remedy (eg, no digging, no well installation)	<i>Environmental Protection Easement and Declaration of Restrictive Covenants, June 2002</i>

### **Systems Operations/Operation & Maintenance (O&M)**

#### **Soil O&M**

Quarterly inspections of the engineered cap are performed on behalf of the Cherokee Development Corporation by Great Lakes Environmental. Inspection reports are submitted to EPA. The inspection reports to date indicate that the soil remedy is being maintained properly. The condition of the cap is excellent. The condition of the remainder of the Site is also excellent.

#### **Groundwater Operation & Maintenance (O&M)**

The groundwater extraction system at the Site is comprised of three pumping wells, RW-1, RW-2 and RW-3. RW-1 and RW-2 are the two original pumping wells, installed and operated since 2003. The recovery system was shut down from October 2010 through April 2013 in order to assess if contaminant of concern (COC) concentrations in the groundwater would rebound to historical concentrations.

RW-3 was added to the extraction system in December 2014 in an attempt to further control groundwater migration downgradient of the sentinel well MW-10 series. The maximum pumping rate for wells RW-1 and RW-2 is 5 gpm. The maximum pumping rate for the recently installed RW-3 is 10 gpm.

Groundwater monitoring for both the on-property and off-property plume includes groundwater level measurements and contaminant concentrations in all monitoring wells. Monitored natural attenuation parameters are also collected. Goodyear conducts groundwater sampling on a quarterly basis. Reports are submitted to EPA annually. The most recent annual report was submitted to EPA in March 2017. Goodyear also inspects Regulator No. 8, which relays a potential overflow condition to the Site and shuts off the pumps.

Potential Site impacts from climate change have been assessed, and the performance of the remedy is currently not at risk due to the expected effects of climate change in the region and near the Site.

### III. PROGRESS SINCE THE LAST REVIEW

**Table 2:** Protectiveness Determinations/Statements from the 2012 FYR

<b>OU #</b>	<b>Protectiveness Determination</b>	<b>Protectiveness Statement</b>
2	Protective	The implemented remedy for the soils and sediments at the Forest Glen Mobile Home Subdivision Superfund Site protects human health and the environment. There are no exposure pathways that could result in unacceptable risks and none are expected, as long as the Site use does not change and the implemented engineered and institutional controls are properly operated, monitored, and maintained.
3	Short-term Protective	The implemented groundwater remedy at the Forest Glen Mobile Home Subdivision Superfund Site currently protects human health and the environment because groundwater contamination remains on-site and all residences and businesses are on public water. In order for the remedy to be protective in the long-term, the pump and treat system needs to be turned on, investigation for residual source material on-site needs to occur, and an MNA study needs to be conducted to ensure complete degradation of contaminants.
Site wide	Short-term Protective	The implemented remedies at the Forest Glen Mobile Home Subdivision Superfund Site currently protect human health and the environment because all soils and sediments have been excavated and capped, groundwater contamination remains on-site, and all residences and businesses are on public water. In order for the remedy to be protective in the long-term, the pump and treat system needs to be turned on, investigation for residual source material on-site needs to occur, and an MNA study needs to be conducted to ensure complete degradation of contaminants.

**Table 3:** Status of Recommendations from the 2012 FYR

<b>OU #</b>	<b>Issue</b>	<b>Recommendations</b>	<b>Current Status</b>	<b>Current Implementation Status Description</b>	<b>Completion Date (if applicable)</b>
3	Groundwater concentrations rebounding	Restart pump and treat system	Completed	The extraction well system was restarted in December 2014. RW3 was added to enhance the capture of the extraction system.	12/1/2014
3	Groundwater data does not show complete biodegradation	Conduct MNA study	Completed	Goodyear submitted a monitored natural attenuation report which provides multiple lines of evidence demonstrating natural attenuation at the site.	1/31/2014
3	Asymptotic contaminant levels in monitoring wells 5S and 6D	Investigate presence of residual source material in these areas	Completed	Goodyear provided contaminant trend analyses which indicated there is residual contamination present.	4/30/2014

#### **IV. FIVE-YEAR REVIEW PROCESS**

##### **Community Notification, Involvement & Site Interviews**

On November 14, 2016, EPA Region 2 posted a notice on its website indicating that it would be reviewing site cleanups and remedies at 38 Superfund sites in New York and New Jersey, including the Forest Glen Mobile Home Subdivision Site. The announcement can be found at the following web address: [https://www.epa.gov/sites/production/files/2016-11/documents/five\\_year\\_reviews\\_fy2017\\_final.pdf](https://www.epa.gov/sites/production/files/2016-11/documents/five_year_reviews_fy2017_final.pdf). In addition, EPA has notified the local community that it will be conducting a FYR of the site. Once the FYR is completed, the results will be posted electronically online at <http://www.niagarafallsusa.org> and will also be made available for public viewing at the US EPA Region 2 Western New York Public Information Office, 186 Exchange Place, Buffalo, New York. The telephone number of the local site repository is 716.551.4410.

No interviews were conducted for this review.

##### **Data Review**

Groundwater elevations are measured quarterly at monitoring wells MW-1S, MW-1D, MW-4S, MW-4D, MW-5S, MW-5D, MW-6S, MW-6D, MW-6DD, MW-7S, MW-7D, MW-7DD, MW-8S, MW-8D, MW-8DD, MW-10S and MW-10D (Figure 3). Groundwater samples are subsequently collected from these monitoring wells on a quarterly basis.

The groundwater extraction system at the Site is comprised of three pumping wells, RW-1, RW-2 and RW-3. RW-1 and RW-2 are the two original pumping wells, installed and operated since 2003. The recovery system was shut down from October 2010 through April 2013 in order to assess if contaminant of concern (COC) concentrations in the groundwater would rebound to historical concentrations.

RW-3 was added to the extraction system in December 2014 in an attempt to further control groundwater migration downgradient of the sentinel well MW-10 series. The maximum pumping rate for wells RW-1 and RW-2 is 5 gpm. The maximum pumping rate for the recently installed RW-3 is 10 gpm.

#### *Groundwater Elevation Monitoring*

The comparison of the baseline shallow and deep bedrock groundwater elevation contour maps, dated 2000, which represent pre-pumping conditions at the Site, to the 2016 shallow and deep bedrock groundwater elevation contour maps indicates that the groundwater recovery system creates an inward hydraulic gradient toward the extraction wells.

Based on the groundwater elevation measurements, the shallow and deep groundwater in the vicinity of RW-3 have been influenced since initiating operation of RW-3. The groundwater extraction system is achieving hydraulic control, however, a review is underway to determine the optimal pumping rate for RW-3.

#### *Groundwater Quality Monitoring*

The most recent groundwater sampling data reviewed for this FYR was from the April 2017 sampling event. A review of the data and trend graphs, presented in Figure 2, is discussed below for on-site and off-site monitoring wells. The location of monitoring wells for the on-site and off-property plume can be seen in Figure 1. On-property wells are identified as MW-4 series, MW-5 series, MW-6 series and MW-10 series (sentinel well). The off-property wells are identified as MW-7 series and MW-8 series.

#### *On-property Wells*

- TCE was only detected above groundwater quality standards in on-site monitoring well MW-5S. MW-5S has shown an increasing trend (with seasonal fluctuations) since the recovery system was re-started. The maximum concentration of TCE in MW-5S during this FYR period was 100 µg/L in 2016.
- *Cis*-1,2-dichloroethene (*cis*-1,2-DCE) concentrations were detected above regulatory standards MWs 5S, 6S, 6DD and 10S during this FYR period, as follows:
  - MW-5S showed an increase in the April 2017 sampling event, but overall had a decreasing trend (with seasonal fluctuations) since the recovery system was re-started. The maximum concentration of 2,700 µg/L was detected in 2013. In 2016, *cis*-1,2-DCE concentration was detected at 180 µg/L.
  - MW-6S have shown a rebound from below regulatory standards to 73 µg/L in 2014 since the system was shut down, but continue to decrease over time since the recovery system was restarted. *cis*-1,2-DCE was detected at 6.9 µg/L in 2016.
  - MW-6DD have shown an increasing trend since the recovery system was shut down, but a decline in concentrations since the recovery system was restarted. The maximum concentration of *cis*-1,2-DCE at 39 µg/L was detected in 2013. In 2016, *cis*-1,2-DCE was detected at 8.6 µg/L.
  - MW-10S have shown an increasing trend (from below regulatory standards) since the recovery system was restarted and the RW-3 was brought online. The maximum concentration of *cis*-1,2-DCE in 2016 was 14 µg/L.

- Vinyl chloride (VC) concentrations were detected above regulatory standards during this FYR period in MWs 5S, 6S, 6D, 6DD, 8D and 10S, as follows:
  - MW-5S increased after the recovery system was shut down, but have shown a decreasing trend since RW-3 was brought online. In the past five years, the maximum concentration of VC was detected at 590 µg/L in 2013. In 2016, VC was not detected above the laboratory method detection limit.
  - MW-6S were below regulatory standards from 2010 until March 2014. The recovery well system was restarted in April 2014. RW-3 was added to the recovery system in August 2014. Since 2014, concentrations of VC have exhibited an increasing trend. In 2016, VC concentrations were detected at 6.2 µg/L.
  - MW-6D exhibited a decreasing trend after the recovery system was restarted and the RW-3 was brought online. VC concentrations declined to below laboratory method detection limits in since 2014.
  - MW-6DD exhibited a significant decline in concentration since the recovery system was restarted and RW-3 was brought online.
  - MW-8D VC were above regulatory standards from 2012 through 2014 and exhibited a slight increase with some seasonal fluctuations. After RW-3 was brought online concentrations began to decrease and are below regulatory standards from 2014 through the most recent sampling event.
  - MW-10S have shown an increase from below the laboratory method detection limit to a maximum concentration of 2.8 µg/L in 2016. In 2017, VC was detected at 1.4 µg/L which is below regulatory standards.

The increasing trends in the concentrations of *cis*-1,2-DCE and VC in the on-property wells appear to be the result of the movement of groundwater from the residual source material under the cap continuing to impact the groundwater concentrations, as well as the breakdown products of TCE.

#### *Monitored Natural Attenuation*

The off-property portion of the plume (MW7 and MW-8 series) is not captured by the recovery system. The ROD indicates that the off-property plume would be allowed to naturally attenuate. Natural attenuation allows naturally occurring environmental processes (*i.e.*, dilution, dispersion, biodegradation, adsorption) to reduce contaminant mass. A 2014 report showed that multiple lines of evidence demonstrate that natural attenuation is occurring at the Site.

Groundwater analytical results during this FYR period indicate that TCE, *cis* 1,2-DCE and VC in the MW-7 series have been below regulatory standards.

In the MW-8 series, TCE, *cis* 1,2-DCE and VC have been below regulatory standards in MW-8S and MW-8DD for this FYR period. In MW-8D TCE and *cis* 1,2-DCE were also below regulatory standards in this FYR period with the exception of VC, which was detected above regulatory standards from 2012 through 2014. Since RW-3 was brought online, VC concentrations in MW-8D were detected below regulatory standards from 2014 through the most recent sampling event.

## **Site Inspection**

The inspection of the Site was conducted on May 31, 2017. In attendance was Gloria M. Sosa, EPA RPM. The purpose of the inspection was to assess the protectiveness of the remedy. The cap was in good condition. There were no apparent changes to wetland or creek. The vegetation was well established.

## **V. TECHNICAL ASSESSMENT**

**QUESTION A:** *Is the remedy functioning as intended by the decision documents?*

The soil and sediment remedies identified in the ROD for OU2 in the 1999 ROD included excavation, consolidation, and capping of soils, as well as capping sediments in the forested wetland. Based on review of the inspection reports, photographs and existing data, the remedy is still functioning as intended.

The groundwater remedy consists of the extraction and off-site treatment of contaminated groundwater from the on-property plume and monitored natural attenuation of the off-property plume. In 2014 the system was restarted and RW-3 was added to the extraction well system to reduce concentrations of VOCs in the on-property wells and to prevent further migration of the groundwater plume.

A review of the groundwater monitoring data indicates that VOC contamination still exists on the property, specifically in MW-5S, which is located near residual source material below the cap. VOC concentrations above regulatory standards also exist in the off-property monitoring wells. These concentrations appeared to have rebounded since the recovery system was shut down, however, since the recovery system has been restarted and RW-3 has been brought online, it is expected that VOC concentrations on the property as well as the off-property monitoring wells will continue to decrease.

A review of groundwater contour maps indicates that there is an inward gradient on the property that is controlling migration of the groundwater plume. However, concentrations in the downgradient sentinel well 10S have increased slightly as a result of the recovery system being suspended. These increasing trends in the concentrations of *cis*-1,2-DCE and VC indicate that the movement of groundwater from the residual source material under the cap, as well as the breakdown products of TCE, continue to impact the groundwater concentrations in the on-property wells. Goodyear is currently determining the optimal pumping rate for RW-3 to ensure that further migration of contaminants from that area does not occur.

Institutional controls continue to preclude any development activities that would impair the cap in place. Ongoing O&M ensures that the integrity of the cap is maintained as well. In addition, soil and sediment outside the capped area have met residential standards and are suitable for unlimited use without restriction of exposures.

**QUESTION B:** *Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?*

There have been no changes in the physical conditions of the Site over the past five years that would change the protectiveness of the remedy. The human health risk assessment (HHRA) concluded that future residential exposure to contaminants in Site soil (via direct contact) and groundwater (via ingestion) would result in human health risk and hazard exceeding EPA threshold criteria. The COCs identified for the Site include VOCs, SVOCs (primarily PAHs) and metals. Land use assumptions, exposure assumptions and pathways, and clean up levels considered in the 1998 and 1999 RODs followed the Risk Assessment Guidance for Superfund used by the Agency and remain valid. Although specific parameters may have changed since the time the risk assessment was completed, the process that was used remains valid.

The Remedial Action Objectives (RAOs) established in the 1999 ROD are as follows:

- Prevent direct contact with contaminated soils and sediments.
- Mitigate the potential for contaminants to migrate from the soil into the ground water.
- Reduce or eliminate the threat to human health and the environment posed by ground-water contamination by remediating ground water to MCLs, thereby restoring the aquifer to beneficial uses.
- Reduce or eliminate the potential for migration of contaminants to potential receptors.

The RAOs established in the 1999 remain valid.

The ROD established the federal maximum contaminant levels (MCLs) and New York State Department of Environmental Conservation Class GA groundwater standards as the cleanup criteria for the COCs in groundwater, which also remain valid.

***Changes in Toxicity Characteristics***

At the time of the risk assessment, the following contaminants in Site soil and sediment did not have toxicity values: phenyl isothiocyanate, 2-mercaptobenzothiazole, 2-anilinobenzothiazole, perylene, n,n-diphenyl-1,4-benzenediamine, phenothiazine, and benzothiazole. Toxicity values remain undeveloped for each of these COCs with the exception of phenothiazine and n,n-diphenyl-1,4-benzenediamine. In addition, a revised toxicological review of benzo(a)pyrene, a COC present sitewide, was incorporated into the EPA Integrated Risk Information System (IRIS) in January of 2017. Despite the absence of chemical-specific toxicity values and updates to the toxicological review of benzo(a)pyrene, the remedy remains protective because areas containing these contaminants were capped, excavated, or otherwise treated; and no exposure to soils, sediments or groundwater contaminated with these chemicals occur.

***Soil Vapor Intrusion***

EPA evaluated soil vapor intrusion at the Site based on groundwater concentrations. The only building overlying the on-property and off-property plumes is the on-property commercial building. The building design included a vapor mitigation system; therefore, this pathway is adequately addressed. The soil vapor intrusion pathway should be further evaluated in the event that other portions of the property are developed with new buildings because elevated VOC levels remaining in groundwater.



### *Ecological Risk*

The ecological risk assessment for the Site indicated that chemicals in the soil were present at concentrations that could result in impairment to ecological receptors at the Site. Given that the contaminated soils were excavated, consolidated, and capped, and the wetland sediments were capped, the potential for exposure to ecological receptors has been eliminated.

**QUESTION C:** *Has any other information come to light that could call into question the protectiveness of the remedy?*

No. There is no new information that would call into question the protectiveness of the remedy. The land use remains commercial/light industrial and is expected to remain commercial/light industrial.

## **VI. ISSUES/RECOMMENDATIONS**

There are no issues or recommendations in this FYR.

## **VII. PROTECTIVENESS STATEMENT**

Protectiveness Statement	
<i>Operable Unit:</i> 02	<i>Protectiveness Determination:</i> Protective
<i>Protectiveness Statement:</i> The implemented remedy for the soils and sediments at the Forest Glen Mobile Home Subdivision Superfund Site protects human health and the environment.	

Protectiveness Statement	
<i>Operable Unit:</i> 03	<i>Protectiveness Determination:</i> Protective
<i>Protectiveness Statement:</i> The implemented groundwater remedy at the Forest Glen Mobile Home Subdivision Site protects human health and the environment.	

Site wide Protectiveness Statement	
<i>Protectiveness Determination:</i> Protective	
<i>Protectiveness Statement:</i> The implemented remedy at the Forest Glen Mobile Home Subdivision Site protects human health and the environment.	

## **VIII. NEXT REVIEW**

The next FYR report for the Forest Glen Mobile Home Subdivision Superfund Site is required five years from the completion date of this review.

## **APPENDICES**

**APPENDIX 1: DOCUMENTS REVIEWED FOR FOURTH FIVE-YEAR REVIEW**

**APPENDIX 2: CHRONOLOGY OF EVENTS**

<b>APPENDIX 1: DOCUMENTS REVIEWED FOR FIFTH FIVE-YEAR REVIEW</b>
1999 Record of Decision for OU2 & OU3 (Soil & Groundwater)
Remedial Action Report
Operations and Maintenance Manual
Fourth Five-Year Review
2012 – 2016 Annual Groundwater Monitoring Reports
2013 – 2017 Quarterly Inspection Reports

<b>APPENDIX 2: CHRONOLOGY OF EVENTS</b>	
<b>ACTIVITY</b>	<b>DATE</b>
Niagara County Health Dept. soil sample analysis detected phenolic resins	1980
Site referred to EPA	1987
EPA sampling detects volatile and semi-volatile organics & metals	1987-1988
ATSDR Pubic Health Advisory issued	July 1989
Temporary Relocation begins	August 1989
Site listed on the National Priorities List	November 1989
Focused Feasibility Study and Proposed Plan	November 1989
Record of Decision for OU1 (Relocation)	December 1989
Permanent Relocation begins	June 1990
Final resident relocated from the Site	December 1992
EPA begins Remedial Investigation	June 1994
Feasibility Study for soil conducted	August 1997
First Five-Year Review conducted	September 1997
Proposed Plan for OU2 (Soil) issued	October 1997
Record of Decision for OU2 (Soil) issued	March 1998
Supplemental Groundwater Feasibility Study conducted	June 1998
Zoning changed from residential to commercial/light industrial	January 1999
Proposed Plan for OU2 & OU3 (Soil & Groundwater) issued	April 1999
Record of Decision for OU2 & OU3 (Soil & Groundwater) issued	September 1999
Remedial Design for soil approved by EPA	July 2002
Remedial Action Work Plan approved by EPA	July 2002
Remedial Action begins	July 19, 2002
Second Five-Year Review conducted	September 2002
Remedial Design for groundwater approved by EPA	April 2003
Construction Completion	September 2003
Remedial Action for Soil completed	September 2004
Third Five-Year Review conducted	September 2007
Groundwater extraction well pumps turned off for study	November 2010
Fourth Five-Year Review conducted	September 2012
RW-3 extraction well added and pumps restarted	December 2014