

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
Interim Final 2/5/99
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)
Migration of Contaminated Groundwater Under Control

Facility Name: MW Manufacturers
Facility Address: 433 N. Main Street, Rocky Mount, VA 24151
Facility EPA ID #: VAD 058 205 170

1. Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

- If yes - check here and continue with #2 below.
- If no - re-evaluate existing data, or
- If data are not available, skip to #8 and enter "IN" (more information needed) status code.

BACKGROUND

The MW Facility is located at the physical address of 433 North Main Street, within the Town of Rocky Mount, Franklin County, Virginia (See attached Figure). The Facility is located on an approximately 38.7-acre property currently occupied by a 578,000 square-foot building that houses MW's manufacturing, warehouse and office operations. The Facility currently manufactures vinyl, wood and wood clad windows with polyvinyl chloride (PVC) components as well as vinyl and wood doors for the residential construction industry. The majority of the site is paved or covered by buildings and other structures. A stream runs through the southern portion of the property parallel to the railroad tracks. Remaining unpaved areas are generally covered with low-lying arid, vegetation, grass or trees in either landscaped or natural area.

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, (GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

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2. Is **groundwater** known or reasonably suspected to be “**contaminated**”¹ above appropriately protective “levels” (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

- If yes - continue after identifying key contaminants, citing appropriate “levels,” and referencing supporting documentation.
- If no - skip to #8 and enter “YE” status code, after citing appropriate “levels,” and referencing supporting documentation to demonstrate that groundwater is not “contaminated.”
- If unknown - skip to #8 and enter “IN” status code.

Rationale and Reference(s):

The following table shows constituents detected in groundwater above the National Primary Drinking Water Maximum Contaminant Levels (MCLs) published by EPA or the EPA Regional Screening Levels (RSLs) for Tapwater (where no MCL is available).

Table 1. Contaminants of Concern in Groundwater	
Contaminant of Concern (COC)	Well(s) with Observed Exceedance
1,2,3-trimethylbenzene	MW-2, MW-6, PZ-3, PZ-4
1,2,4-trimethylbenzene	MW-2, MW-6, PZ-3, PZ-4, MW-11
1,3,5-trimethylbenzene	MW-2, MW-6, PZ-3, PZ-4
Acrolein	MW-2
Pentachlorophenol	MW-5, MW-6, MW-7, MW-9, PZ-3
2,3,4,6-tetrachlorophenol	MW-6
Naphthalene	MW-2, MW-6, PZ-3, PZ-4, MW-11
VOC TICs (1,2-dimethylbenzene, isopropyl alcohol, 1-methylethyl-benzene, naphthalene, n-propylbenzene)	MW-6, MW-11, PZ-3 and PZ-4
Safrole	MW-11
SVOC TICs (1,2,3-trimethylbenzene, 1,2,4-trimethylbenzene, pentachlorophenol)	MW-5, MW-6, MW-7, PZ-1, PZ-3 and PZ-4
1,2,3-trichloropropene	PZ-1
Oleic Acid	MW-5, MW-7
Hexavalent Chromium	MW-5, MW-7, MW-8, and MW-9
Iron	MW-3, MW-4, MW-9, MW-10, MW-11, PZ-3, PZ-4
Manganese	MW-1, MW-2, MW-3, MW-4, MW-6, MW-7, MW-8, MW-9, MW-10, PZ-1, PZ-3, PZ-4
IPBC (No Screening Level Available)	MW-9, PZ-3
2,3,7,8-TCDD Toxicity Equivalent Factor (TEQ)	PZ-3

Footnotes:

¹“Contamination” and “contaminated” describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate “levels” (appropriate for the protection of the groundwater resource and its beneficial uses).

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3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within “existing area of contaminated groundwater”² as defined by the monitoring locations designated at the time of this determination)?
- If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the “existing area of groundwater contamination”².
- If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the “existing area of groundwater contamination”²) – skip to #8 and enter “NO” status code, after providing an explanation.
- If unknown - skip to #8 and enter “IN” status code.

Rationale and Reference(s):

There are two distinct groundwater plumes observed on site. The eastern plume is primarily observed in in the saprolite and has migrated from the source area (AOC 2: Former Dip Tank-1) shown in the attached figure in exposure Area 1 to the west/southwest similar to the regional groundwater flow direction. The western plume originating from areas of SWMU-7 (former Dip Tank-3) and SWMU-14 (former Dip Tank-2) has resulted in discontinuous lenses of NAPL, contaminated soils, and a dissolved groundwater plume in fill and alluvial materials (Exposure Area 3). The fill is relatively thick and variable which has resulted in variability of flow in the western portion of the site.

The shallow contaminated groundwater plume has been delineated under the building. It appears that the majority of the contaminant mass in groundwater is not highly mobile due to an area of apparent stagnant groundwater flow in the vicinity of the source area. There is observable upward groundwater flow from bedrock up to the Fill/Alluvium unit in the western plume area. Very little evidence of site related impacts is observed in the bedrock screened wells (MW-1, MW-3, and MW-4). Based on the chemical concentrations, migration from the fill/alluvium units to the bedrock units is not a primary pathway for fate and transport of the constituents.

Concentration of constituents of concern generally decreased in most wells from the 2013 Phase I RCRA Facility Investigation (RFI) sampling event to the October/November 2017 and June 2018 Phase II RFI sampling events. In addition, the number of and concentration of detected compounds in the wells screened in the alluvium were generally higher than the wells screened in the deeper bedrock.

Report of RCRA RFI, MW Manufacturers, Inc., Rocky Mount, VA, December 2015.
Report on Phase 2 RFI, Rocky Mount, VA October 2018.

Footnotes:

² “existing area of contaminated groundwater” is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of “contamination” that can and will be sampled/tested in the future to physically verify that all “contaminated” groundwater remains within this area, and that the further migration of “contaminated” groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

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4. Does “contaminated” groundwater **discharge** into **surface water** bodies?

- If yes - continue after identifying potentially affected surface water bodies.
- If no - skip to #7 (and enter a “YE” status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater “contamination” does not enter surface water bodies.
- If unknown - skip to #8 and enter “IN” status code.

Rationale and Reference(s):

Directly south of the Facility is a culvert leading to the unnamed stream (Exposure Area 4); the stream eventually contributes to Furnace Creek approximately 0.5 miles west of the Facility. Surface water from the Facility and a sizable portion of the surrounding properties (including various industrial sites and adjacent rail line to the south) discharge into this culvert. The stream is perennial but widely varies in flow rate and volume during storm events. Based on the detection of site related contaminants in surface water and sediment, the groundwater from the shallow alluvium appears to be discharging near the toe of the fill slope and flows to the stream. In addition, the hydraulic heads in the bedrock screened wells located along the southwestern side of the Facility suggest that the groundwater in the shallow bedrock discharges upward into the stream.

Seasonally, the surface water from the onsite stream recharges the groundwater in the Fill/Alluvium hydro-stratigraphic unit. This results when surface water elevations in the stream nearer the building are comparably higher than the groundwater elevation. However, groundwater discharge to the stream also occurs when the stream elevation is lower and further down the stream where the base elevation is lower.

Reference:

Report of RCRA RFI, MW Manufacturers, Inc., Rocky Mount, VA, December 2015.
Report on Phase 2 RFI, Rocky Mount, VA October 2018.

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5. Is the **discharge** of “contaminated” groundwater into surface water likely to be “**insignificant**” (i.e., the maximum concentration³ of each contaminant discharging into surface water is less than 10 times their appropriate groundwater “level,” and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?
- If yes - skip to #7 (and enter “YE” status code in #8 if #7 = yes), after documenting:
 1) the maximum known or reasonably suspected concentration³ of key contaminants discharged above their groundwater “level,” the value of the appropriate “level(s),” and if there is evidence that the concentrations are increasing; and
 2) provide a statement of professional judgment/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.
- If no - (the discharge of “contaminated” groundwater into surface water is potentially significant) - continue after documenting:
 1) the maximum known or reasonably suspected concentration³ of each contaminant discharged above its groundwater “level,” the value of the appropriate “level(s),” and if there is evidence that the concentrations are increasing; and
 2) for any contaminants discharging into surface water in concentrations³ greater than 100 times their appropriate groundwater “levels,” the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.
- If unknown - enter “IN” status code in #8.

Rationale and Reference(s):

The human health screening evaluation revealed the following constituents were detected in surface water at concentrations exceeding the lower of the following screening levels (National Recommended Water Quality Criteria- Human Health Criteria Table (human health for the consumption of water+ organism); and Virginia Water Quality Standards (VAWQS) Public Water Supply (PWS Criteria).

Table 2. Constituents of Concern in Surface Water (Human Health)	
Constituent of Concern (COC)	Location with Detected Exceedance
bis(2-ethylhexyl)phthalate	STA-101
Pentachlorophenol	STA-102, 103, 104,-105, 106, 107
Iron	STA-105, 106, 107, 108
Manganese	STA-105, 106, 107, 108
2,3,7,8-TCDD Toxicity Equivalent Factor (TEF)	All locations (STA-101 to STA-108)

During ecological screening, the following constituents were detected in surface water above the EPA Region III Biological Technical Assistance Group (BTAG) screening levels published July 2006: Pentachlorophenol and 2,3,7,8-TCDD (TEQ).

References and Footnotes:

Report of RCRA RFI, MW Manufacturers, Inc., Rocky Mount, VA, December 2015.
 Report on Phase 2 RFI, Rocky Mount, VA October 2018.

³ As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

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6. Can the **discharge** of “contaminated” groundwater into surface water be shown to be “**currently acceptable**” (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented₄)?

- If yes - continue after either:
- 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site’s surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater;
 - OR
 - 2) providing or referencing an interim-assessment₅, appropriate to the potential for impact that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment “levels,” as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.
- If no - (the discharge of “contaminated” groundwater can not be shown to be “**currently acceptable**”) - skip to #8 and enter “NO” status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.
- If unknown - skip to 8 and enter “IN” status code.

Rationale and Reference(s):

Detected concentrations in surface water and sediment in the unnamed stream were below VDEQ RCRA Human Health risk thresholds for current or future land use conditions which assume that trespassing could potentially occur in the stream. This conclusion is based on the assumption that trespassing populations would include older children and adults, given the physical location and associated difficulty in accessing the stream. The terrain is not conducive to trespasser exposure, however, the facility placed “No Trespassing” signs along the stream to keep trespassers off the property and stream. If, under a future land use condition, access to the stream was made available such that a young child (ages 1 to 6) could trespass in the stream, the hazard index associated with sediment is estimated to be above a value of 1. However, future institutional and/or engineering controls will be required to eliminate this potential scenario.

Risks to benthic invertebrates were evaluated by comparing analytical data for surface water and sediment to surface water and sediment quality values; polycyclic aromatic hydrocarbons (PAHs) were assessed using equilibrium sediment benchmarks. The results of the BERA indicate that constituents in surface water and sediment do not pose unacceptable risks to the benthic community because exposure point concentrations do not exceed benchmark values and the results of the rapid bioassessment suggest that the greatest impact to the benthic community is associated with physical stressors (e.g., storm water flow). Although fish are not present in this reach of the stream, these conclusions can be extended to fish.

The results of the BERA indicate that constituents in surface water and sediment do not pose unacceptable risks to mammals and birds, as evidenced by hazard quotients that do not exceed a value of 1.

⁴ Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

⁵ The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

Reference:

Report of RCRA RFI, MW Manufacturers, Inc., Rocky Mount, VA, December 2015.
Report on Phase 2 RFI, Rocky Mount, VA October 2018.

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7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the “existing area of contaminated groundwater?”

If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations, which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the “existing area of groundwater contamination.”

If no - enter “NO” status code in #8.

If unknown - enter “IN” status code in #8.

Rationale and Reference(s):

As a means to track changes in groundwater quality, the collection of semi-annual groundwater samples will be conducted. Groundwater monitoring will be performed for the same network of 13 monitoring wells/piezometers that were sampled during the 2017 Phase 2 RFI which includes all available wells installed onsite.

The following table identifies monitoring wells and the associated SWMUs/AOCs.


Table 3. Semiannual Monitoring Well Network


Area/SWMU	Monitoring Well
AOC-2	MW-6, MW-7, MW-8
Southwestern Corner of Main Building	MW-1, MW-3, MW-4, MW-5, MW-9, MW-10, MW-11
Inside Main Building	PZ-1, PZ-3, and PZ-4

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8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

- YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the MW Manufacturers, EPA ID # VAD 058 205 170, located at 433 N. Main Street, Rocky Mount, VA 24151. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.
- NO - Unacceptable migration of contaminated groundwater is observed or expected.
- IN - More information is needed to make a determination.

Completed by  Date 2/12/2019
Tara Mason
Remedial Project Manager

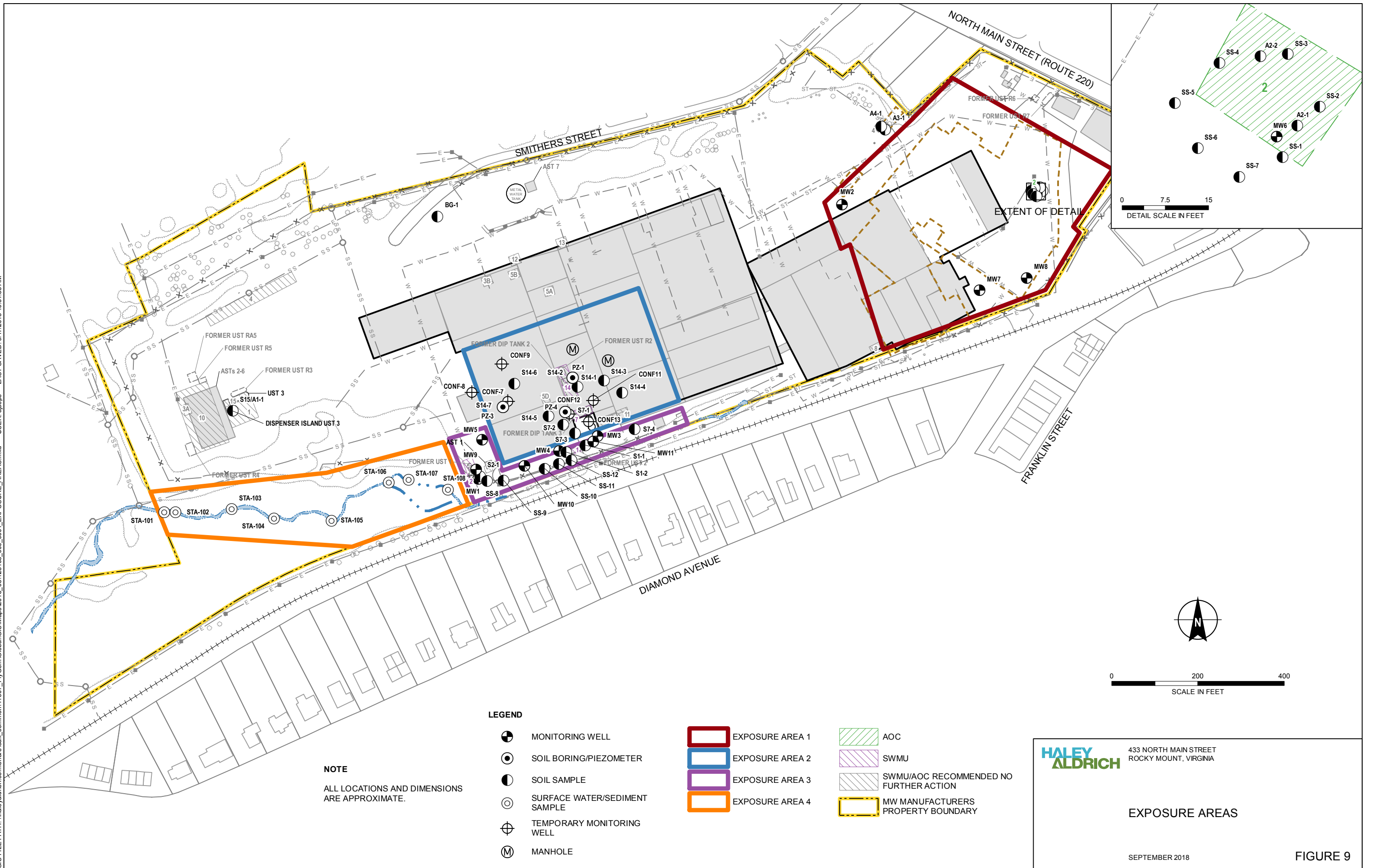
Supervisor  Date 2/12/2019
Brett Fisher
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Locations where References may be found:

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NOTE
ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

LEGEND

-  MONITORING WELL
-  SOIL BORING/PIEZOMETER
-  SOIL SAMPLE
-  SURFACE WATER/SEDIMENT SAMPLE
-  TEMPORARY MONITORING WELL
-  MANHOLE
-  EXPOSURE AREA 1
-  EXPOSURE AREA 2
-  EXPOSURE AREA 3
-  EXPOSURE AREA 4
-  AOC
-  SWMU
-  SWMU/AOC RECOMMENDED NO FURTHER ACTION
-  MW MANUFACTURERS PROPERTY BOUNDARY



433 NORTH MAIN STREET
ROCKY MOUNT, VIRGINIA

EXPOSURE AREAS

SEPTEMBER 2018

FIGURE 9