PROPOSED PLAN

Site Remediation

J.P. Stevens Chemical Plant #1 (Piedmont) Site

410 Old Pelzer Road, Piedmont, SC

October 2017

ANNOUNCEMENT OF PROPOSED PLAN

The South Carolina Department of Health and Environmental Control (DHEC or the Department) recently completed an evaluation of cleanup alternatives to address contamination at the former J.P. Stevens Chemical Plant #1 facility also known as the Piedmont Site (Site). This Proposed Plan identifies the Department's Preferred Alternative for cleaning up contamination in groundwater and soil on the facility property and provides the reasoning for this preference. In addition, this Proposed Plan includes summaries of other cleanup alternatives evaluated. These alternatives were identified based on information gathered during remedial investigations and pilot studies conducted by responsible parties.

The Department is presenting this Proposed Plan to inform the public of our activities, gain public input, and fulfill the requirements of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (National Contingency Plan or NCP). This Proposed Plan summarizes information that can be found in greater detail in the April 21, 2017 Site-wide Feasibility Study (FS) and other documents contained in the Administrative Record file. The Department encourages the public to review these documents to gain a comprehensive understanding of the Site and activities that have been conducted.

The Department will select a final remedy after reviewing and considering comments submitted during the 30-day public comment period. The Department may modify the Preferred Alternative or select another response action based on new information and public comments. Therefore, the public is encouraged to review and comment on all the alternatives presented in this Proposed Plan.

DHEC's Preferred Groundwater Cleanup Summary

DHEC's preferred remedial alternative (Alternative #4) includes in-situ oxidation of source areas with groundwater recovery/treatment and monitored natural attenuation. The remaining pages provide additional details.

MARK YOUR CALENDAR

- **PUBLIC MEETING:**

When: **November 9, 2017, at 6:30 pm**

Where: **Piedmont Community Center**
1 Main Street
Piedmont, SC

DHEC will hold a meeting to explain the Proposed Plan. The Feasibility Study evaluated six options to address the contamination on the facility property. After the Proposed Plan presentation, DHEC will respond to your questions. Oral and written comments will be accepted at the meeting.

- **PUBLIC COMMENT PERIOD:**
  November 9 through December 11, 2017

DHEC will accept written comments on the Proposed Plan during the public comment period. Submit your written comments to:

Judy Canova, Project Manager
DHEC-L&WM
2600 Bull St.
Columbia, SC 29201
Email: canovajl@dhec.sc.gov

- **FOR MORE INFORMATION:**

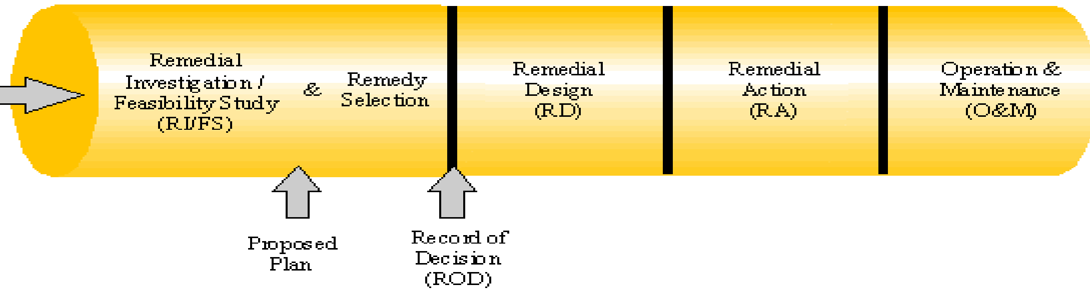
Call: Judy Canova, Project Manager, 803-898-0816

See: DHEC's website at:
www.scdhec.gov/apps/environment/publicnotices

View: The Administrative Record at the following locations:

- Library: Anderson County Library, Piedmont Branch
  1407 SC-86
  Piedmont, SC 29673
  Hours: Monday – Wednesday, Friday 9:30 am – 6 pm
  Thursday 11:00 am – 7 pm
  Saturday 9:30 am – 1:30 pm
- DHEC
  2600 Bull Street- Columbia, SC
  Contact: Freedom of Information Office
  (803) 898-3817
  Hours: Monday - Friday 8:30 am- 5:00 pm

The Department becomes aware of the contamination at the J. P. Stevens Site



Site History

The Site is located at 410 Old Pelzer Road, in Greenville County, South Carolina. Figure 1 illustrates the site location. The facility was constructed in 1970 by J.P. Stevens and Co., Inc. to make textile coating and finishing chemicals. It is currently operated by Ashland, Inc. in the manufacture of adhesives and polymers.

Since 1991, numerous investigations have been conducted at the facility and off-property to evaluate groundwater, surface water, soil, and soil vapor quality, and to determine the extent of contamination originating from historic operations at the facility. A number of pilot studies have been performed from 2002-2015 to identify what types of treatment will work best to address the contamination at the Site.

This work has confirmed the presence of various contaminants in soils, groundwater, and surface water at concentrations above levels of concern. Primary contaminants of concern (COCs) are volatile organic chemicals and have been grouped into three categories including Chlorinated Ethenes (CE), Chlorobenzenes (CB), and BTEX. CE includes perchloroethylene (PCE), trichloroethylene (TCE), cis-1,2 dichloroethylene (DCE), and vinyl chloride (VC). CB includes trichlorobenzene (TCB), dichloroebenzene (DCB), and chlorobenzene (CB). BTEX includes Benzene, Toluene, Ethylbenzene, and Xylene.

On October 5, 2004, a proposal to capture and treat groundwater contamination beyond the facility boundary was presented to the community. This system was installed and began operations in 2006. This Proposed Plan addresses the remaining contamination within the facility boundary. Figure 2 shows the area of groundwater contamination and the property boundary.

Assessment Activities

A series of investigations performed from 1991 until 2008 identified the following areas where contamination was released to the environment. The source areas are: Tank Farm, Former Grease Trap, Drumming Room, Wastewater Treatment Plant, Oil Retention Basin, Sprayfield, Sludge Field and Drum Burial area, These areas are shown in Figure 3. The following paragraphs provide more details regarding the source areas and the types of contamination that were found.

Tank Farm

The Tank Farm area has CE, CB and benzene in soil and groundwater. Much of the contamination in this area is located in the groundwater near the aboveground storage tanks (ASTs) adjacent to a rail spur. Several of these tanks were sources of releases of PCE and CB to soil and groundwater.

Former Grease Trap

The former Grease Trap was previously used to collect process wastewater from historical textile dyeing and finishing operations. The Grease Trap area was excavated in 2002. Elevated concentrations of CE and CB are present in the unsaturated soil and in groundwater within this area that measures approximately 50 by 50 feet.

Wastewater Treatment Plant (WWTP)

Three wastewater treatment lagoons were operated by J.P. Stevens. Two of these units were closed in 1997/1998. At that time, wastewater and impacted sludge/soil were excavated and removed. A third lagoon was previously backfilled by J.P. Stevens. The current WWTP was constructed over this location. Previous investigations in this third lagoon have revealed that soil and sludge continue to release CE, CB, and benzene to groundwater.

Drumming Room

This source area was a room containing a solvent tank used during the J.P. Stevens' operations. Accessible soil under the Drumming Room was excavated in 2000. This area has been repurposed for filling of drums and totes with products. Groundwater samples collected near this area contain low concentrations of CE.

Oil Retention Basin

This area was used to contain skimmings and floating residuals collected from the WWTP lagoons. Targeted excavation and removal of contaminated soils was conducted within the former Oil Retention Basin in 2008. Groundwater in this area remains contaminated with CE, CB, and BTEX.

Spray Field

The Spray Field was previously utilized by J.P. Stevens for spray field application of wastewater. The soil in this area contained CE and was treated with soil vapor extraction. In 2002, remedial goals were achieved for unsaturated soil and the treatment was discontinued. Groundwater in this area contains CE and CB.

Sludge Field and Drum Burial Area

During J.P. Stevens' operations, WWTP sludge was land applied in this area. Within the Sludge Field, there was also an area where J.P. Stevens buried drums containing waste. Soil, sludge, and drums were excavated from this area in 1993. Concentrations of COCs in the groundwater within the area declined substantially following the excavation.

Site Characteristics

The Site lies at the northern end of a south-draining watershed roughly bounded to the east by Old Pelzer Road and to the west by South Carolina Highway 20. Surface water and groundwater within this watershed connect to a stream that drains south-southwest. This stream empties into the Saluda River, approximately 2 miles south of the Site. Much of the land within this area consists of forest and farm fields. A residential community is located to the southeast of the Site.

The Site is located in the Piedmont physiographic province which has bedrock, transition zone, and saprolite (soil resulting from weathering of rock) as the three primary water bearing units. The bedrock produces water from fractures while the saprolite contains water in soil and is usually where the water table occurs. COCs have migrated vertically into the groundwater through the upper saprolite zone, the transition zone and the upper portion of fractured bedrock. Downgradient of source areas, COCs in the groundwater plume primarily occur in the transition zone.

Figure 4 is a detailed map showing the extent of PCE contamination in groundwater on the facility property. PCE was used to represent the Site groundwater contamination as it is present across the Site whereas the chlorobenzene and BTEX contamination covers a smaller area within the plume.

As a result of discharge of contaminated groundwater to the on-site stream, surface water within the property fence-line is also contaminated.

Previous Remedial Activities

Soil

The Drum Burial Area and Sludge Field were excavated and filled with clean soil in 1993. Soil from two basins previously used for wastewater treatment was excavated in 1997 and 1998. Accessible soil under the Drumming Room was excavated in 2000, and the Grease Trap area was excavated in 2002. In 2008, contaminated soil was removed from the Oil Retention Basin. All excavated material was hauled to approved disposal facilities. Soil vapor extraction was used to remove contaminants from unsaturated soil in the Spray Field and was determined to be complete in 2002.

Groundwater

Current groundwater remediation includes an extraction system at the property boundary in addition to extraction wells beyond the fence line. This system captures and treats contaminated groundwater, significantly reducing the movement of contamination beyond the property boundary. Installation of the recovery system began in 2003 and the system was expanded in 2007 and 2008.

Surface Water

An air sparging system is used to treat contaminated surface water so that no COCs are present in the creek beyond the property fence line. Air sparging is a process that uses bubbles of air to remove chemicals from water. This system was installed in 1997.

Pilot Studies

Because the contamination in groundwater and soil is a unique mixture of several types of chemicals with different properties, a number of pilot studies have been performed. The purpose of the various pilot studies was to identify technologies that might successfully treat the types of contamination in a safe and cost-effective manner. Injection of Hydrogen Release Compounds (HRC) was evaluated in 2002 in groundwater beyond the property boundary. Injection of oxidants was tested from 2003 through 2004 in the Wastewater Treatment area and ozone sparging was evaluated in the Tank Farm area. In 2007 and 2008, liquid chemical oxidation and soil vapor extraction were tested in the Tank Farm area. In 2014 and 2015, microcosm studies were completed on samples collected from the Site to determine the potential for bioremediation to address the contamination. Zero valent iron (ZVI) was also tested as part of the microcosm study. Pilot studies showed that bioremediation was likely to be effective in some, but not all, of the areas of contamination. Ozone sparging and chemical oxidation were found to be effective in the Tank Farm area which has all the different types of contamination identified at the Site. Health and safety issues associated with ozone sparging were identified during the pilot test. ZVI was effective on a subset of the chemicals in groundwater.

Summary of Site Risks

The area around the Site is zoned for industrial, commercial, and residential usage. The affected aquifer is a potential underground drinking water source. The primary exposure route for groundwater would be contact with or ingestion of contaminated groundwater. Public water is available in this area and is used by most residents and businesses. Twenty-one wells are located within a half-mile of the Site and two of these wells are in an area that could be affected by contamination at the Site. These two wells were sampled and no VOCs were detected. These wells are no longer in use. The residential wells are shown in Figure 5.

Contamination in soil, groundwater, and surface water may affect the industrial worker or trespasser through contact with the skin, accidental ingestion, or inhalation of vapors associated with the COCs.

Remedial Action Objectives

The remedial action objectives (RAOs) for the development and evaluation of alternatives for Site remediation are:

- Protect human health from potential exposure to COCs.
- Prevent transport of COCs from sources into the underlying groundwater.
- Prevent migration of COCs in groundwater and surface water.
- Restore groundwater to Maximum Contaminant Limits (MCLs).
- Achieve Site-wide compliance with surface water quality goals.
- Mitigate the potential for COC discharge to surface water.

Based on information collected during the previous investigations and pilot studies, a Feasibility Study (FS) was developed to identify, develop, and evaluate cleanup options and remedial alternatives. The FS for this site was approved on June 13, 2017. The Department's Preferred Alternative identified in this Proposed Plan is necessary to protect public health and the environment from actual or potential releases of hazardous substances.

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Scope and Role of Action

The proposed action in this plan will be the final cleanup action for the Site. The RAOs for this proposed action include preventing exposure to, and preventing the further migration of, contamination in groundwater, surface water, and soil. The proposed response actions will permanently reduce the toxicity, mobility, and volume of remaining contamination in soil, groundwater, and surface water at the Site. Remedial alternatives were developed in the FS after the delineation of the nature and extent of contamination, identification of potential human health risks, and completion of several pilot studies.

In the FS, six remedial alternatives were proposed. Each remedial alternative evaluated by the Department is described briefly below. All alternatives include continued maintenance of property fence lines, property security, and pavement maintenance. Alternatives 3 through 6 all include a) air sparging in surface water, b) groundwater extraction, treatment, and discharge of treated groundwater to the creek, and c) monitoring of groundwater and surface water quality with periodic reporting to DHEC. Contingency measures are proposed for Alternatives 4 through 6 in the event that the proposed alternative needs to be supplemented with additional action to achieve remedial goals in a timely manner. These contingencies include soil vapor extraction, injection of additional treatment amendments into the soil and groundwater, and expansion of the groundwater extraction system. Also, if a source area becomes accessible and excavation of source material is possible, the source area may be excavated and contaminated material would be transported to an approved disposal facility.

Summary of Remedial Alternatives	
ALTERNATIVE	**COMPONENTS**
1: No Action	• No active remediation or monitoring • Discontinue all groundwater and surface water treatment • Continue regular facility and site maintenance practices • Periodic regulatory reviews • Estimated cost: $0 • Estimated time required: >100 years
2: Monitored Natural Attenuation (MNA)	• Continue groundwater and surface water monitoring • Discontinue all groundwater and surface water treatment • No active remediation for source areas or groundwater • Estimated cost: $5,039,510 • Estimated time required: >100 years
3: Groundwater Recovery and Treatment (GRT) with MNA	• Maintain and possibly expand current groundwater recovery and treatment system • No active remedial alternatives for source areas • Achieve RAOs using MNA • Estimated cost: $14,537,535 • Estimated time required: 100 years
4. In-Situ Chemical Oxidation (ISCO) with MNA	• Use chemical oxidants to treat key source areas • Maintain current groundwater recovery and treatment system • Use contingency measures if additional treatment is needed • Achieve RAOs using MNA • Estimated cost: $17,101,397 • Estimated time required: 15 years
5. In-Situ Bioremediation (ISB) with MNA	• Use ISB to treat key source areas where it is appropriate • Maintain current groundwater recovery and treatment system • Use contingency measures if additional treatment is needed • Achieve RAOs using MNA • Estimated cost: $18,861,122 • Estimated time required: 20 years
6. Zero-Valent Iron (ZVI) with MNA	• Use ZVI to treat key source areas where it is appropriate. • Maintain current groundwater recovery and treatment system • Use contingency measures if additional treatment is needed • Achieve RAOs using MNA. • Estimated cost: $19,005,122 • Estimated time required: 20 years

Remedial Alternative Descriptions

Alternative 1: No Action
Under this remedial alternative, groundwater monitoring and/or active remedial measures would stop. Existing site controls (*i.e.,* site fencing, routine area inspections, etc.) would continue as part of regular facility and site maintenance practices. Because contaminants would remain in the soil and groundwater at levels above remedial objectives, this alternative would also include periodic regulatory reviews by DHEC.

Alternative 2: Monitored Natural Attenuation (MNA)
This alternative has no provision for source control measures, groundwater recovery and treatment, surface water treatment, or supplemental treatment measures. Operation of the existing groundwater recovery/treatment system and in-stream creek sparger along the site property boundary would be discontinued. MNA would rely on various physical, chemical, and biological processes, including: degradation, dispersion, dilution, volatilization, and sorption to reduce concentrations of site contaminants. Routine groundwater and surface water monitoring using existing wells would be continued to evaluate the overall effectiveness of the MNA remedy.

Existing site control features (*e.g.,* site fencing, existing pavement, and routine facility inspections) would all continue as part of on-going facility operation and maintenance practices. Because site contaminants would remain in the soils and groundwater at levels above RAOs for an undefined period of time, this alternative would include periodic regulatory reviews by DHEC.

Alternative 3: Groundwater Recovery and Treatment (GRT) with MNA
This remedial alternative would rely on groundwater recovery and treatment as the primary means of remediating contaminants in soil, groundwater, and surface water. Alternative 3 would be expected to achieve limited success over an extended time frame. This is because groundwater recovery and treatment would not address source area contaminants in a timely manner. Source areas would continue to contribute contaminants to the groundwater, extending the time required to achieve remedial goals. At the current levels of COCs detected in the soil and groundwater, this treatment alternative would realistically require many decades to achieve site closure.

The existing in-stream creek sparger system would continue to operate until contamination within the creek declined enough to terminate stream sparging operations. An existing network of groundwater monitoring wells, recovery wells, and related treatment equipment has already been installed. Currently, there are 11 groundwater recovery wells at the Site, including on the facility property line, key locations downgradient of known COC source areas, and four locations beyond the fence line. The purpose of the groundwater recovery and treatment system is to capture and treat site-related contaminated groundwater.

This alternative could also include expansion of the existing groundwater recovery and treatment system to allow expanded recovery and treatment of COCs in the groundwater downgradient of source areas. The existing groundwater treatment system has been designed to accommodate the possibility of future treatment system upgrades and expansion.

Figure 6 provides a conceptual layout of the current groundwater recovery system and possible additional recovery wells. The specifics of possible future expansion of the groundwater recovery and treatment system will remain the focus of future performance monitoring activities.

Alternative 4: In-Situ Chemical Oxidation (ISCO) with MNA
This alternative would include source control measures focused on oxidizing contaminants present within the following source areas: Tank Farm, Former Grease Trap, Drumming Room, Oil Retention Basin, and Wastewater Treatment Plant.

Alternative 4 would use ISCO as the primary source area treatment technology. The most promising chemical oxidants for the Site include: catalyzed sodium persulfate, sodium percarbonate, and ozone sparging. Direct ISCO injections would be employed within each of the known COC source areas.

Because of the aggressive nature of ISCO treatment, chemical oxidants introduced into a source area should have a significant effect on COC-affected soils and groundwater within the source areas, and should also improve groundwater quality downgradient of the treatment area. Downgradient groundwater recovery wells may be installed to increase the observed rate of groundwater flow and enhance distribution of the oxidant.

Most of the source areas are situated within or near areas containing dense facility infrastructure, overhead/underground utilities, and active chemical production operations, where health and safety considerations are important. Successful application of ISCO within source areas soils and groundwater is dependent upon the extent that the oxidant can be applied and distributed across the prescribed treatment area.

After a certain time period, ISCO chemicals will become depleted after continuous contact with naturally occurring organic materials and site COCs. This will likely result in varying levels of effectiveness within different source areas.

As part of this alternative, the existing groundwater recovery and treatment system will continue to operate and may be expanded to improve oxidant distribution in groundwater. Once the source areas are addressed, MNA will be more likely to achieve site remedial goals. The existing creek sparging system would continue to operate until contamination within the creek declined enough to terminate operations.

Figure 7 shows a conceptual layout of the areas where chemical oxidants would be injected and illustrates possible additional groundwater recovery locations that might be considered with this treatment alternative. The actual number and location of prescribed injection well points required to target and enhance distribution of the selected treatment reagents throughout each source zone area will be developed as part of future planning and design.

Contingency measures to address contamination not treated by ISCO could include: a) Soil vapor extraction (SVE) to enhance capture and removal of contaminants within unsaturated soil. This may require field testing to confirm where soil is amenable to SVE. b) Supplemental injection of additional treatment amendments (*i.e.,* ISCO, ISB, ZVI) to further reduce contamination within the source areas and downgradient areas of groundwater contamination. c) Addition of groundwater recovery wells to recover and treat contamination within the groundwater downgradient of source areas. d) Source area excavation and disposal in the event an unexpected opportunity is created by a future facility expansion/closure initiated by the property owner/operator.

Alternative 5: In-Situ Bioremediation (ISB) with MNA

In situ bioremediation (ISB) is accomplished by injecting materials such as molasses, vegetable oil and/or microorganisms to promote either anaerobic or aerobic microbiological processes. Under optimal conditions, ISB can be effectively applied to treat a range of different organic compounds.

A microcosm study performed by Clemson University revealed that ISB was not suitable to address the contamination at the Tank Farm and the former Grease Trap area. There are other areas of the Site where the mixture of chemicals requires two types of ISB in sequence to address the contamination. Under the appropriate conditions, sequential ISB may treat the contamination within the WWTP area and the Oil Retention Basin. If ISB can be employed as an effective treatment within the WWTP source area and the former Oil Retention Basin source area, then supplemental treatment of downgradient plume areas might also be possible.

The ISB remedial alternative also may incorporate additional groundwater recovery wells to expand recovery and treatment of contaminants downgradient of source areas. As contaminant levels decline to conditions more suitable for MNA and the existing groundwater recovery and treatment system continues to operate, there is an increasing likelihood that various physical, chemical, and biological processes will reduce contamination so that remedial goals can be achieved.

The existing creek sparging system would continue to operate until contamination within the creek declined enough to terminate operations.

Figure 8 illustrates a conceptual layout of the areas where ISB injection and groundwater recovery wells might be located. The actual number and location of prescribed injection well points required to target and enhance distribution of the selected treatment reagents throughout each source zone area will be developed as part of future planning and design.

Contingency measures to address contamination not treated by ISB could include: a) Soil vapor extraction (SVE) to enhance capture and removal of contaminants within unsaturated soil. This may require field testing to confirm where soil is amenable to SVE. b) Supplemental injection of additional treatment amendments (*i.e.,* ISCO, ZVI) to further reduce contamination within the source areas and downgradient areas of groundwater contamination. c) Addition of groundwater recovery wells to recover and treat contamination within the groundwater downgradient of source areas. d) Source area excavation and disposal in the event an unexpected opportunity is created by a future facility expansion/closure initiated by the property owner/operator.

Alternative 6: Zero-Valent Iron (ZVI) with MNA

This alternative consists of injecting ZVI into groundwater to destroy contamination. Finely milled ZVI particles could be injected into source areas such as the Tank Farm, Drumming Room, former Grease Trap, Oil Retention Basin, and WWTP area. The Clemson University microcosm study showed that ZVI could successfully treat CE in the areas where ISB was determined to be ineffective. ZVI is a proven and reliable technology for the remediation of CE.

As part of this alternative, the existing groundwater recovery and treatment system will continue to operate and may be expanded to improve ZVI distribution and to improve recovery and treatment of contaminants remaining in groundwater. Once the source areas are addressed, MNA will be more likely to achieve site remedial goals. The existing creek sparging system would continue to operate until contamination within the creek declined enough to terminate operations.

Figure 9 provides a conceptual layout of the areas where ZVI may be injected. The actual number and location of prescribed injection well points required to target and enhance distribution of ZVI throughout each source zone area will be developed as part of future planning and design. ZVI injection is not viewed as a suitable, stand-alone treatment method for BTEX or CB.

Contingency measures to address contamination not treated by ZVI could include: a) Soil vapor extraction (SVE) to enhance capture and removal of contaminants within unsaturated soil. This may require field testing to confirm where soil is amenable to SVE. b) Supplemental injection of additional treatment amendments (*i.e.,* ISCO, ISB) to further reduce contamination within the source areas and downgradient areas of groundwater contamination. c) Addition of groundwater recovery wells to recover and treat contamination within the groundwater downgradient of source areas. d) Source area excavation and disposal in the event an unexpected opportunity is created by a future facility expansion/closure initiated by the property owner/operator.

Evaluation of Alternatives

The National Contingency Plan requires the Department use specific criteria to evaluate and rank the different remediation alternatives individually and against each other in order to select a remedy. This section of the Proposed Plan profiles the relative performance of each alternative against the criteria, noting how it compares to the other options under consideration. The criteria are:

1. Overall protection of human health and the environment;
2. Compliance with State and Federal requirements;
3. Long-term effectiveness and permanence;
4. Reduction of toxicity, mobility, or volume through treatment;
5. Short-term effectiveness;
6. Implementability;
7. Cost; and
8. Community Acceptance

Comparative Analysis of Alternatives

1. Overall Protection of Human Health and the Environment
When evaluating alternatives in terms of overall protection of human health and the environment, consideration is given to the degree to which Site-related risks are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

Alternatives 1 (No Action) and 2 (MNA) rank low for protection of human health and the environment. These alternatives would allow continued releases of contamination to groundwater and surface water and contaminants would be allowed to migrate beyond the property boundary. An extensive time period would be required to achieve remedial goals and it is uncertain that remedial goals would be met at any time in the future. Alternative 3 (GRT) would require a long time frame to be effective and is considered less protective. The level of protection of Alternative 4 (ISCO) is the highest because this technology is effective for all compounds and is estimated to require the least amount of time. Alternatives 5 (ISB) and 6 (ZVI) have limited effectiveness for some of the contaminants at the Site and would require slightly more time to achieve goals. For this reason they are ranked lower than Alternative 4 (ISCO).

2. Compliance with State and Federal Requirements
Each of the alternatives is evaluated with respect to the ability to comply with applicable State and Federal environmental statutes and regulations.

Alternatives 1 and 2 are not likely to achieve regulatory goals and rank low, Alternative 3 will keep contamination from moving past the property line but will not achieve regulatory standards in a reasonable period of time, so it does not rank as high as the remaining alternatives. Alternatives 5 and 6 will only work for selected areas at the Site but are likely to achieve regulatory goals in these areas. Alternative 4 is the alternative most likely to achieve regulatory goals throughout the Site.

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3. Long-term Effectiveness and Permanence
This factor considers the ability of an alternative to maintain protection of human health and the environment over time.

Alternative 1 and 2 are unlikely to achieve remedial goals even over the long-term and rank the lowest. It is possible that Alternative 3 could be effective over an extended period of time. However, the long-term effectiveness of Alternative 3 would be reduced by potential continuing releases of contamination from source areas. Because the effectiveness of ISB and ZVI

(Alternatives 5 and 6) are limited to selected areas of the Site, they are rated moderate with respect to this criteria. Alternative 4 ranks the highest for this criteria because it is more likely to address contamination throughout the Site in a permanent manner.

4. Reduction of Toxicity, Mobility, or Volume (TMV) through Treatment
This factor evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present. The guidance for evaluating alternatives prefers those alternatives that reduce or permanently eliminate contamination rather than transfer or relocate contamination from one place to another.

Alternative 1 (No Action), Alternative 2 (MNA) and Alternative 3 (GRT) rank low because they do not use treatment to reduce contaminant toxicity, mobility, or volume. Alternative 3 would reduce mobility but would transfer contamination to the air rather than destroy contamination. Because Alternatives 5 (ISB) and 6 (ZVI) will reduce toxicity and/or eliminate portions of contamination at the Site through treatment, they are ranked higher than Alternatives 1 through 3. However, Alternative 4 (ISCO) ranks highest for this criteria because it is more likely to destroy the contamination at the Site which would also reduce the contaminant mobility.

5. Short-term Effectiveness
Short-term effectiveness addresses potential human health and environmental risks associated with the alternative during the construction and implementation phase. Alternative 4 (ISCO) and 6 (ZVI) will have an immediate effect on the contamination present at the Site when the injections occur. Alternative 4 will be more likely to have short-term effectiveness across the Site as ISCO treats all contaminants known to be present at the Site whereas ZVI will only treat a subset of the contamination. Material handling by remediation workers and safety are important issues for ISCO, ZVI, and potentially ISB (Alternative 5). Groundwater recovery, MNA, and No Action (Alternatives 1 through 3) would have no short-term benefits but also no risk to the community or on-site worker. None of the alternatives are risks to the community. Alternative 4 ranks the highest for this criteria and Alternatives 1 and 2 rank the lowest.

6. Implementability
The analysis of implementability considers the technical and administrative feasibility of implementation, as well as the availability of required materials and services.

Groundwater monitoring is on-going, and continued monitoring and maintenance of the well network would be readily implementable with any of the alternatives. All of the alternatives are implementable with varying levels of effort. Alternatives 1 through 3 are the easiest to implement because minimal labor is required for Alternatives 1 and 2 and Groundwater Recovery (Alternative 3) is ongoing at the Site. Implementation of ISB, ZVI, and ISCO will require injection permits and will be subject to the ability of equipment to successfully inject the material. It is anticipated for these alternatives that permits can be obtained and that injection will be feasible. Limitations to injection would be areas congested with infrastructure, but these limitations would apply to any of the injection technologies (Alternatives 4 through 6). Alternatives 1 through 3 rank higher than Alternatives 4 through 6 for implementability.

7. Cost
The cost analysis evaluated capital costs and annual operation and maintenance (O&M) costs. The total cost is the sum of initial capital costs and the discounted value of O&M costs over the lifespan of the remedy. No Action (Alternative 1) is the lowest cost, Alternative 2 has a lower cost. The cost estimate for Alternative 3 is intermediate and the costs for Alternatives 4 through 6 are higher with Alternative 6 having the highest estimated cost.

8. Community Acceptance
Community acceptance of the preferred remedy will be evaluated after the public comment period ends. Public comments will be summarized and responses provided in the Responsiveness Summary Section of the Record of Decision document, which will present the Department's final alternative selection. The Department may choose to modify the preferred alternative or select another based on public comments received during the comment period

Summary of the Department's Preferred Alternative

Based on information currently available, the Department believes Alternative 4 (ISCO) would be protective of human health and the environment, would effectively reduce contamination in the short and long-term, would meet regulatory requirements more rapidly, would be cost-effective, and would be a permanent solution to the maximum extent practicable. This remedy also meets the statutory preference for the selection of a remedy that involves treatment as a principle element.

Community Participation

The Department will evaluate comments from the public before selecting a final alternative. A comment period has been established to allow the public an opportunity to submit written comments to the Department. The community is also invited to a public meeting where the Department will discuss the Feasibility Study results, present the preferred alternative, and accept comments on the remedial alternatives. The dates for the public comment period; the date, location, and time of the public meeting; and the locations of the Administrative Record files are provided on the first page of this Proposed Plan.

USE THIS SPACE TO WRITE YOUR COMMENTS

Your input on the Proposed Plan for the J.P. Stevens (Piedmont) Site is important. Comments provided by the public are valuable in helping DHEC select a final cleanup remedy.

You may use the space below to write your comments, then fold and mail or bring to the meeting to give to a SCDHEC representative. Comments must be received or postmarked by December 11, 2017.

If you have any questions, please contact Judy Canova at 803-898-0816. You may also submit your questions and/or comments electronically to: canovajl@dhec.sc.gov.

Name: ____________________________ Telephone: ______________________

Address: ____ Email: __________________________________

Figure 1: J.P. Stevens (Piedmont) Property Location Piedmont, SC

Figure 2: J.P. Stevens (Piedmont) Site Map Showing Property Boundary and Area of Groundwater Contamination.

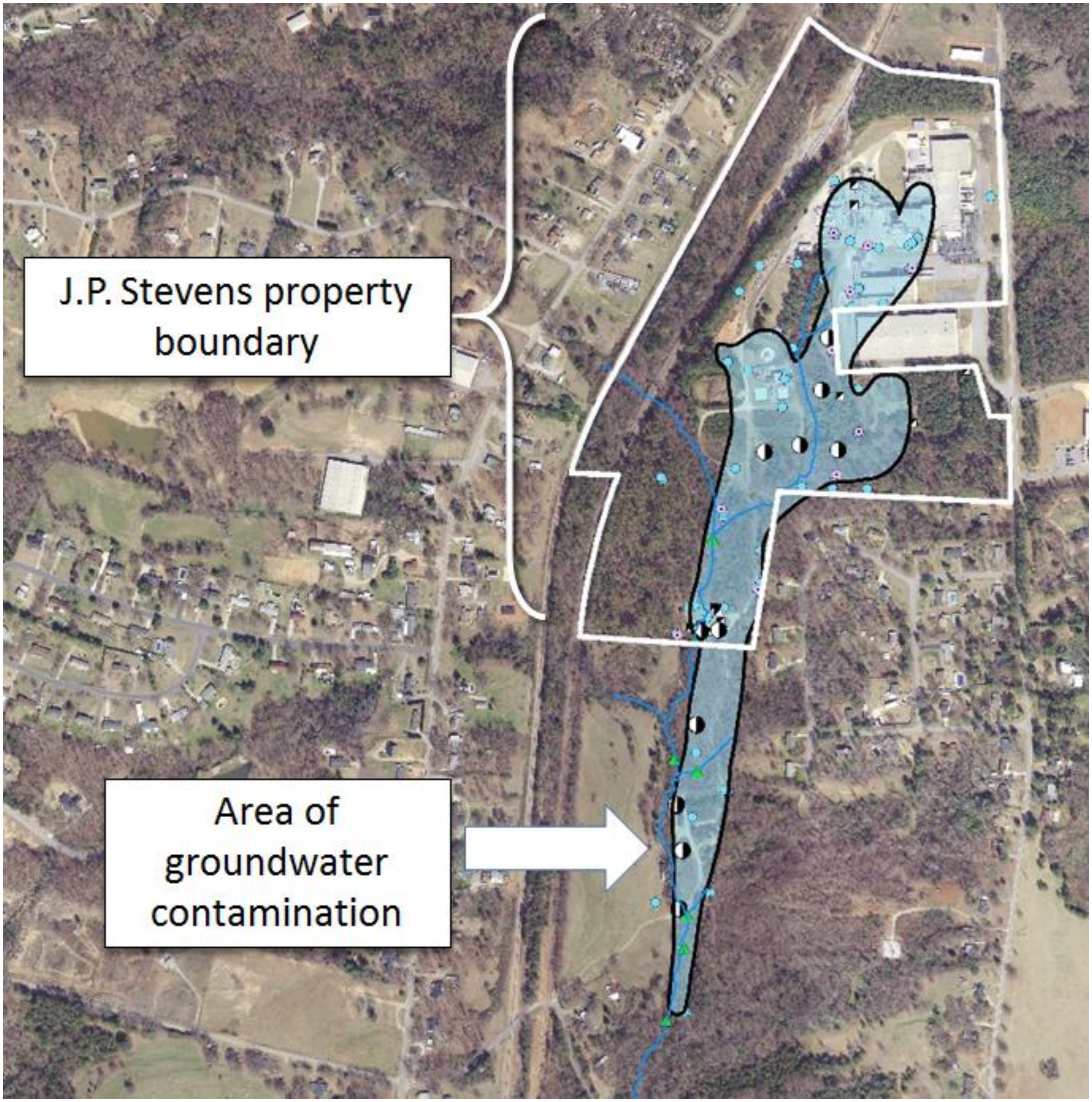

Figure 3: J.P. Stevens (Piedmont) Site Areas of Contamination

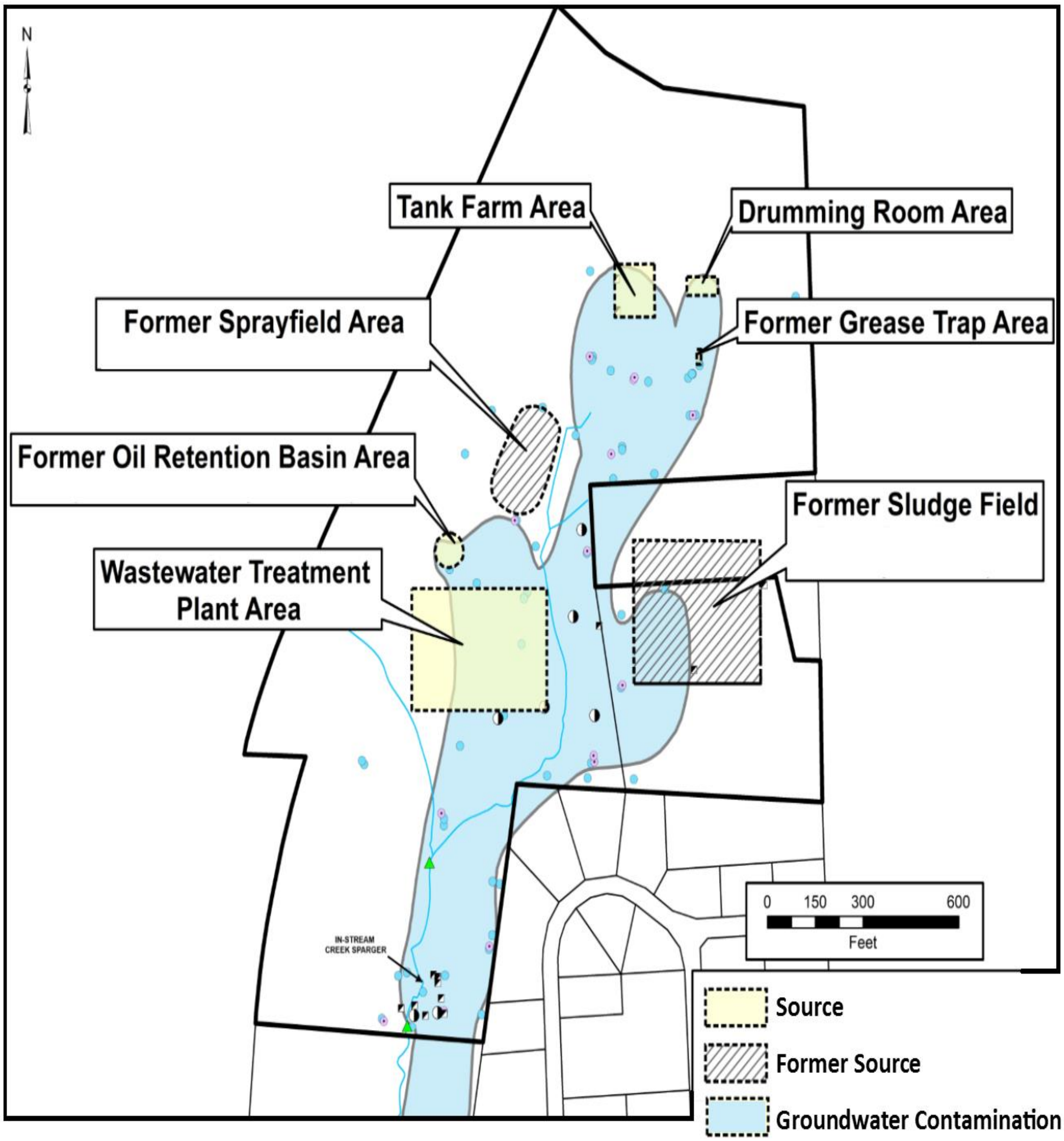

Figure 4: J.P. Stevens (Piedmont) Detailed Map of PCE in Groundwater on the Plant Property.

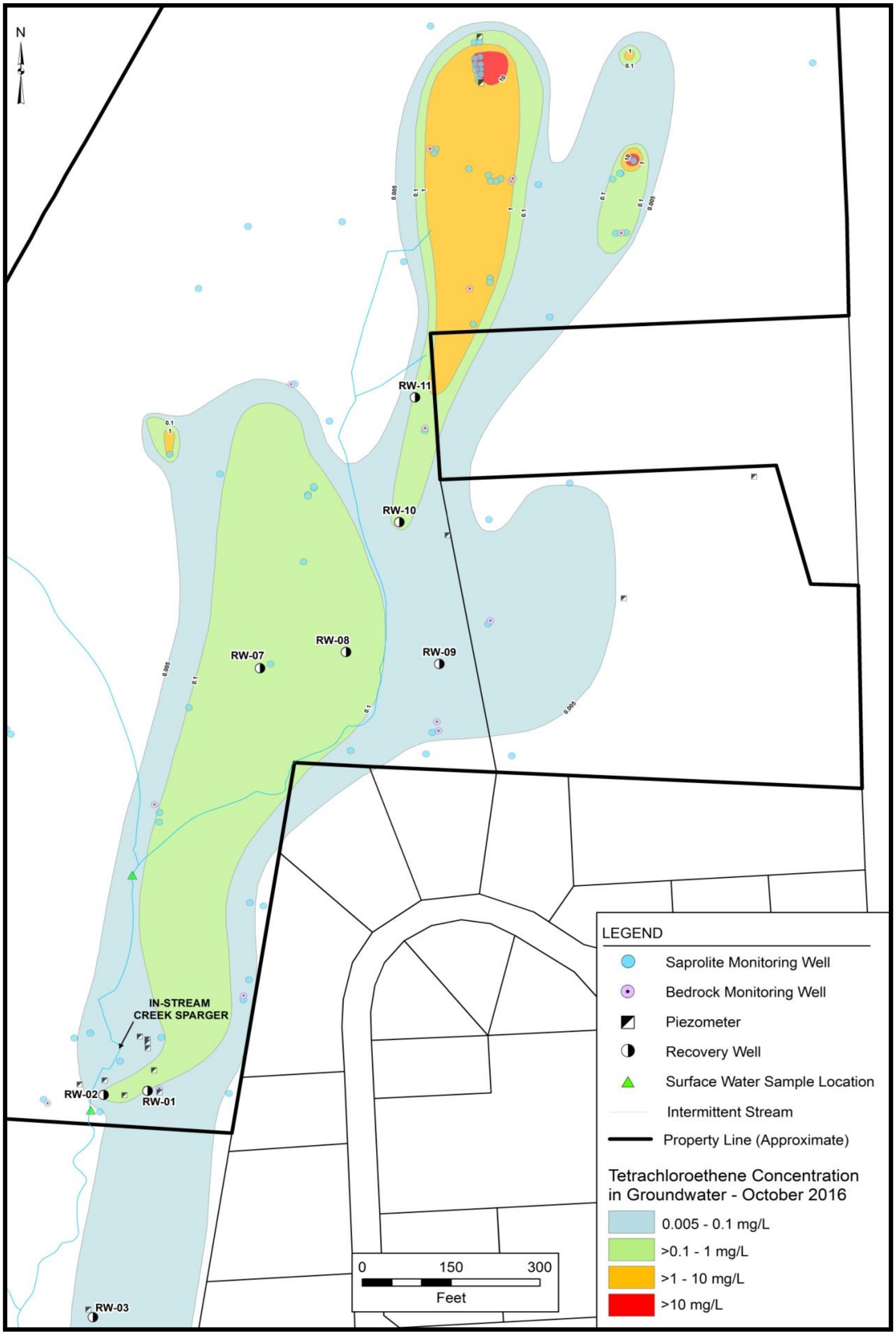

Figure 5: Groundwater Wells near J.P. Stevens (Piedmont) Site

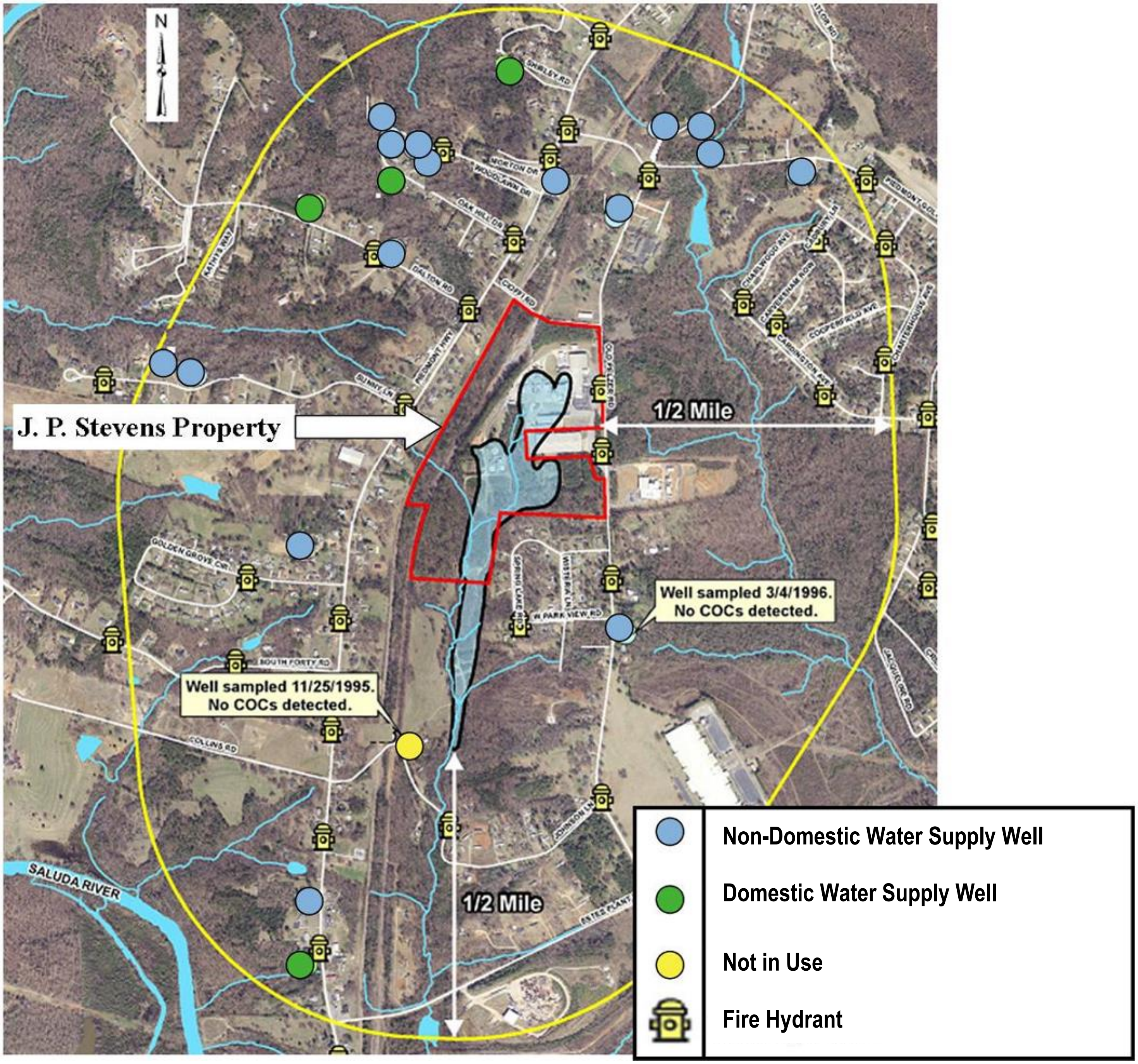

Figure 6: J.P. Stevens Piedmont Site Conceptual Layout of Alternative 3 (GRT) Recovery Wells

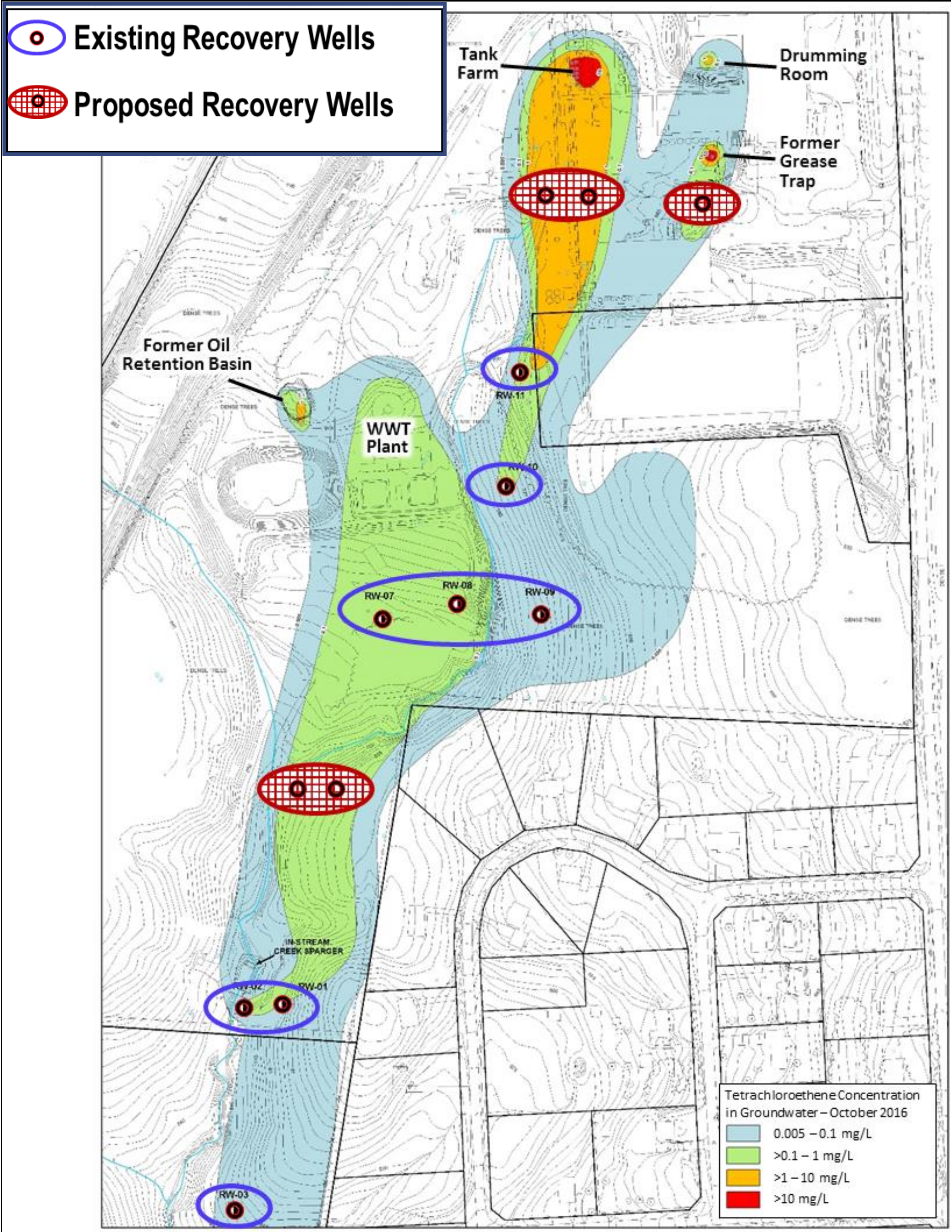

Figure 7: J.P. Stevens Piedmont Site Conceptual Layout of Alternative 4 (ISCO) Treatment Areas

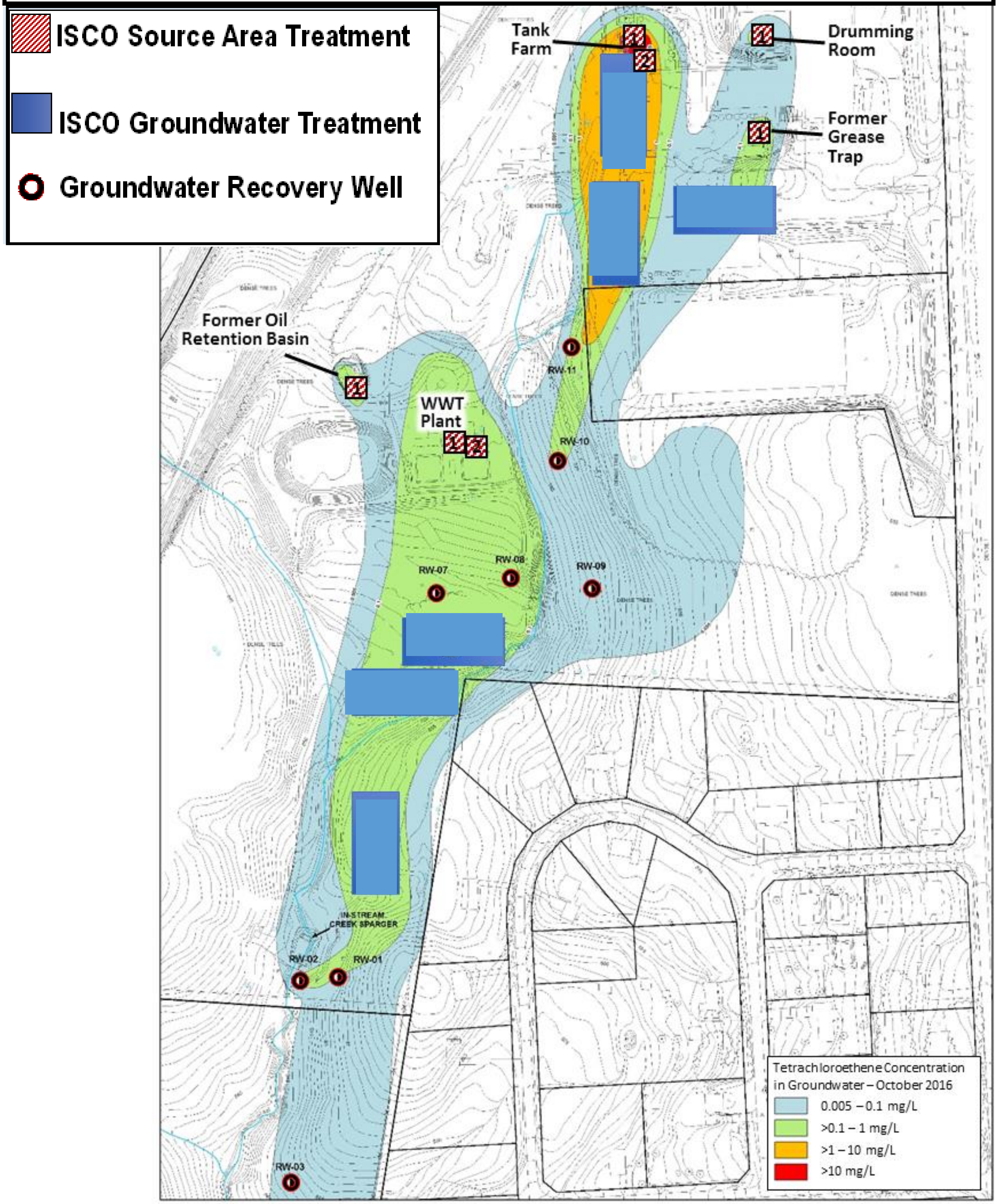

Figure 8: J.P. Stevens Site Conceptual Layout of Alternative 5 (ISB) Treatment Areas

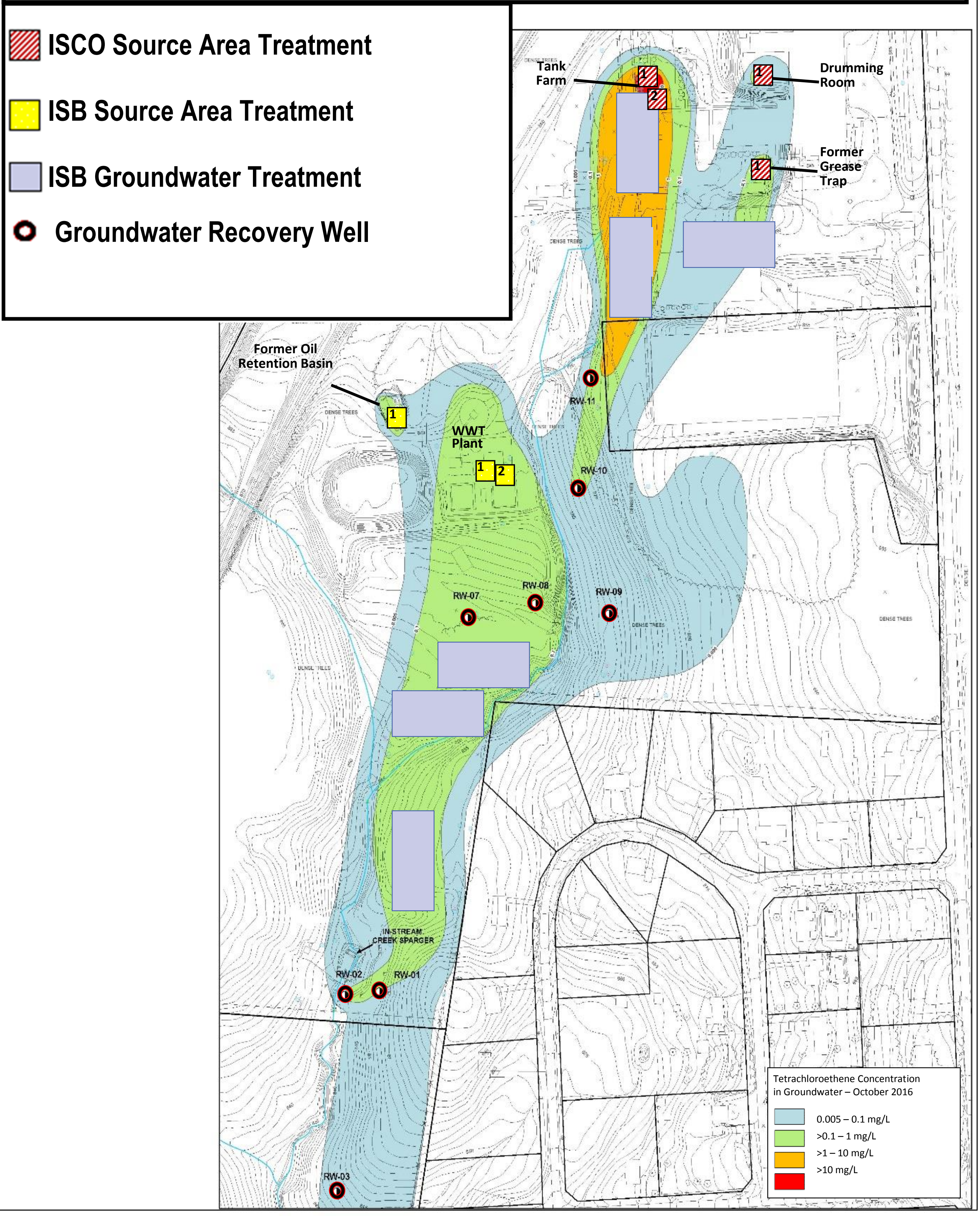

Figure 9: J.P. Stevens (Piedmont) Site Conceptual Layout of Alternative 6 (ZVI) Treatment Areas