Superfund Proposed Plan to
Amend a Portion of the
OU1 Groundwater Remedy

U.S. Environmental Protection Agency
Region 2

Lightman Drum Superfund Site
Winslow Township, NJ
August 2019

EPA ANNOUNCES PROPOSED PLAN FOR REMEDY MODIFICATION

This Proposed Plan presents the proposed amendment to the Record of Decision (ROD) dated, September 30, 2009, for Operable Unit (OU) 1 at the Lightman Drum Superfund Site (Site) in Winslow Township, New Jersey. This document is issued by the U.S. Environmental Protection Agency (EPA), the lead agency for Site activities, in consultation with the New Jersey Department of Environmental Protection (NJDEP), the support agency. The September 19, 2011 ROD for OU2, which addresses a portion of the Site's contaminated soil, is not affected by this Proposed Plan.

The purpose of this Proposed Plan is to, explain the rationale for the proposed amendment to the existing remedy for groundwater hot spots (discrete areas of high concentrations of groundwater contamination) in the downgradient portions of the eastern and western plumes, provide a summary of the remedial alternatives evaluated and solicit public comment. This Proposed Plan also includes a summary of the data from groundwater investigations conducted prior to the 2009 ROD and during the remedial design phase after the ROD was signed. More detailed information can be found in the Remedial Investigation and Focused Feasibility Study (RI/FFS) reports and other documents contained in the Administrative Record for the Site.

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

This Proposed Plan was prepared in accordance with Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §9617(a), and Section 300.435(c)(2)(ii) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). If, after the selection of a remedy in a ROD, a component of the remedy is fundamentally altered, EPA must propose an amendment to the ROD. EPA's proposed amendment to the ROD must be made available for public comment in a Proposed Plan and public comment period.

MARK YOUR CALENDAR

PUBLIC COMMENT PERIOD:
August 26 – September 24 2019
EPA will accept written comments on the Proposed Plan during the public comment period.

PUBLIC MEETING: September 11, 2019
EPA will hold a public meeting to explain the Proposed Plan and all the alternatives presented in the Feasibility Study. Oral and written comments will also be accepted at the meeting. The meeting will be held in the Township Bud Duble Senior Center, 33 Cooper Folly Road, Atco, NJ from 6:30 to 8:30 PM.

For more information, see the Administrative Record at the following locations:

U.S. EPA Records Center, Region 2
290 Broadway, 18th Floor.
New York, New York 10007-1866
(212) 637-4308
Hours: Monday-Friday - 9 am to 5 p.m., by appointment or online at https://www.epa.gov/superfund/lightman-drum

Camden County Library, South County Branch
35 Coopers Folly Road
Atco, NJ 08004
Hours M-F 10am – 9pm, Sat 10am – 6pm

WHY THE REMEDY IS BEING MODIFIED

The OU1 ROD requires removal of groundwater contamination in the source areas using an air sparging and soil vapor extraction (AS/SVE) system and extraction and treatment of groundwater hot spots, consisting of discrete areas of groundwater concentrations of trichloroethylene (TCE) and tetrachloroethylene (PCE) of over 100 micrograms per liter (µg/L) in the downgradient portions of the eastern and western plumes. The ROD also requires Monitored Natural Attenuation (MNA) in the remainder of the downgradient groundwater. Lastly, the ROD requires the establishment of a Classification Exception Area (CEA) as an institutional control to minimize the potential for

exposure to contaminated groundwater until the cleanup goals are met.

The AS/SVE system began operating in February 2013 and continues to operate. Monitoring results show that the system has removed most of the contamination in the source areas. The data also show that, since 2016, the groundwater hot spots are no longer present in the downgradient portions of the eastern and western plumes. Based on these data, EPA is proposing to change the remedy for the hot spots from extraction and treatment to MNA. The remainder of the OU1 remedy would remain unchanged.

SITE DESCRIPTION AND CHARACTERISTICS

The Site covers approximately 15 acres in Winslow Township, Camden County, New Jersey (Block 4404, Lot 6) and falls within the New Jersey Pinelands Protection Area. The Lightman property is approximately 300 feet wide and is bordered by Route 73 to the east and the railroad formerly owned by Pennsylvania Railroad to the west (Figure 1). Currently, the portion of the Site nearest to Route 73 is operated by United Cooperage, a drum brokerage business, which stores drums and tractor trailers at the Site.

The results of investigations conducted at the Site indicate that the area is underlain by well-drained sandy soils with poor filtering capacity. Actively used areas of the Site have a thin layer of relatively impermeable fill. Under the soil is the Cohansey-Kirkwood aquifer system which is used extensively as the potable water supply in the area of the Site. The municipality requires that all properties within 200 feet of the municipal well be connected to the public water supply system and prohibits such properties from using private wells for drinking water.

The Cohansey-Kirkwood aquifer system, which dips eastward toward the Atlantic Ocean is a relatively uniform unconfined aquifer consisting of yellowish brown coarse to fine-grained sand. Groundwater within the aquifer flows primarily to the south in the vicinity of the Site. The base of the Cohansey-Kirkwood formation is defined as the top of a clay bed lying at the base of the Kirkwood at 100 feet below the ground surface.

SCOPE AND ROLE OF THE ACTION

As with many Superfund sites, the contamination at the Lightman Drum Site is complex. In order to manage the cleanup of the Site more effectively, EPA has organized the work into immediate actions to address an imminent threat to human health and the environment, and two phases of long-term cleanup called operable units (OUs).

The immediate actions, known as removal actions, have been completed. In 2007, EPA issued a Removal Order which required excavation of source area soils in the saturated zone near the Former Waste Storage Tanks Area. The excavation was approximately 33 feet by 16 feet by 25 feet deep (over 480 cubic yards). During the removal action, unnaturally colored soils were observed, and after investigation, these soils have been removed. In early 2009, another area of volatile organic compound (VOC)-contaminated soils near the excavation was also identified and characterized.

The first phase of the long-term cleanup of the Site (OU1) addressed the groundwater contamination in the source areas of the eastern and western plumes and in the downgradient groundwater areas and is the subject of this Proposed Plan.

A second ROD (OU2) was issued on September 19, 2011. It addresses a small area of soil contamination near the source area for the eastern plume. The soil is being remediated through use of an SVE system. This SVE system is an extension of the system used for OU1.

SITE HISTORY

Prior to 1974, the Site was used for agriculture. Beginning in 1974, the Lightman Drum Company operated an industrial waste hauling and drum reclamation business there. In 1978, NJDEP issued a one-year Temporary Operating Authorization that allowed for the storage of various wastes including chemical powders, pesticides, waste oil, oil sludges, paints, pigment, thinner, ink residues, ketones, alcohols, and mixed solvents. The permit was not renewed.

In 1987, NJDEP collected soil samples which revealed the presence of various organic and inorganic compounds at the Site. A more extensive investigation of the soil and groundwater took place under a NJDEP Administrative Order from 1989 to 1990. These samples were concentrated in known storage areas.

There were two areas identified as the sources of groundwater contamination:

Unlined Waste Disposal Pit
An Unlined Waste Disposal Pit was located in a small depression in a wooded area in the west-central portion of the Site. This pit was accessed by a dirt road leading from Lightman Drum Company's main operations area. As part of the NJDEP investigation of the Site, it was reported that the pit was used for the disposal of a single tank trailer of wastes including waste paint and possibly oil in 1976. The Lightman Drum Company reportedly removed the waste

from this area shortly after it was deposited.

Former Waste Storage Tanks
Two 5,000-gallon underground storage tanks were formerly located in the north-central area of the Site. The tanks were reportedly used to store waste paint pigments, ink sludges, and thinners. The tanks operated under the NJDEP Temporary Operating Authorization. NJDEP observed the removal of the tanks in 1984.

The NJDEP studies showed the presence of elevated levels of VOCs and semi-volatile organic compounds (SVOCs) in the groundwater and VOCs, SVOCs pesticides, and inorganic compounds in the soil.

In May 1999, NJDEP requested that EPA perform a Hazard Ranking System Evaluation. As a result of the evaluation, EPA placed the Site on the National Priorities List on October 22, 1999. At that time, EPA became the lead agency for Superfund remediation activities at the Site.

In November 2000, EPA issued an Administrative Order requiring a group of Potentially Responsible Parties (PRPs) to conduct a Remedial Investigation and Feasibility Study.

A second Administrative Order (Removal Order) was issued by EPA in 2007, under which the PRPs removed over 480 cubic yards of contaminated soil from the unsaturated and saturated zones near the former Waste Storage Tank area. This contaminated soil was a source of the groundwater contamination. During the soil removal, areas of unnaturally colored soils were discovered. The unnaturally colored soils contained heavy metals, especially lead, and were removed.

An area of soil with elevated levels of VOCs was also identified just east of soil excavation area, near the former Waste Storage Tank area. This soil is the subject of the OU2 ROD.

Summary of Remedial Investigation for OU1

The Remedial Investigation for the Site took place from August 2002 to March 2008. Samples were taken from the soil, sediment, surface water and groundwater. The investigation showed that there was contamination in the soil and groundwater. The soil contamination was found on the Lightman property at the Former Waste Storage Tanks area and the Unlined Waste Disposal Pit area.

Contamination had migrated from the soil into the groundwater, resulting in two groundwater plumes. One plume emanated from the former Waste Storage Tanks area and was referred to as the eastern plume, and the other plume emanated from the Unlined Waste Disposal Pit Area and was referred to as the western plume (Figure 1).

Both plumes were relatively long and narrow and characterized primarily by elevated levels of PCE and TCE. The zones of contamination were located at increasing depths with distance from the source areas. In the downgradient areas, the contaminated zones were overlain by unimpacted (clean) groundwater.

The RI further divided the groundwater into two areas based on distance from the source areas. One area was the groundwater contamination found immediately under the Lightman property and under the first property to the south. This was referred to as the near-site groundwater contamination. The other area was farther to the south and referred to as the downgradient groundwater contamination (Figure 1).

The eastern plume was characterized primarily by its elevated levels of PCE (4,200 µg/L) and TCE (2,100 µg/L) and extended about 4,500 feet downgradient of the Lightman property boundary, at which location it was about 85 feet below ground surface with about 65 feet of non-impacted water above it. The downgradient portion of the eastern plume also contained a few "hot spots" (well-defined areas of relatively high PCE and TCE concentration). During the RI, these hot spots had concentrations of TCE and PCE of over 100 µg/L.

The western plume was also characterized by TCE and PCE contamination and extended 1,500 feet downgradient of the property boundary. At this location, the contamination was about 55 feet below ground surface with about 45 feet of non-impacted water above it.

OU1 ROD

Remedial action objectives (RAOs) were developed for groundwater to address the unacceptable human health risks and environmental concerns posed by Site-related contamination.

- Prevent or minimize potential current and future human exposures including ingestion of and dermal contact with groundwater that presents a significant risk to public health and the environment;

- Minimize the potential for migration of the contaminants of concern in groundwater; and

- Restore the aquifer to Class I-PL standards within a reasonable time frame.

To achieve these RAOs, EPA selected cleanup goals for groundwater. Groundwater cleanup goals for OU1 are based on the New Jersey Class I-PL standards which apply within the New Jersey Pinelands Protection Area. The applicable groundwater. Class I-PL standards are more stringent or equivalent to the Federal Safe Drinking Water Act Maximum Contaminant Levels. The Class I-PL groundwater cleanup goals are 1 µg/L for PCE and 1 µg/L for TCE.

The components of the selected remedy were:

- Air Sparging and Soil Vapor Extraction (AS/SVE) of near-site groundwater contaminants from near the Former Waste Storage Tank Areas (east plume) and Former Unlined Pit Areas (west plume);

- Extraction and treatment of contaminated groundwater found in "hot spots" in the downgradient areas of the east and west groundwater plumes. Treated groundwater will be reinjected;

- Monitored Natural Attenuation (MNA) for the remaining portions of the plume; and

- Establishment of a Classification Exception Area, which is an institutional control, to minimize the potential for exposure to contaminated groundwater until the aquifer meets the cleanup goals.

Five-Year Review Requirements

Because this remedy will not result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, but may take more than five years to attain the remedial action objectives and cleanup levels for the groundwater, a policy review may be conducted within five years of construction completion or the remedial activity for the groundwater operable unit 1 (OU1) at the Site to ensure that the remedy is, or will be, protective of human health and the environment.

Prior to implementation of the remedy, a remedial design (RD) investigation was conducted to further delineate the areal extent of contaminated groundwater and collect enough data to complete the engineering design of the selected remedy. The RD investigation of near-site groundwater included collecting data to determine the exact number and location of the components of the AS/SVE systems. The downgradient RD investigation delineated and further characterized the downgradient contamination.

Downgradient groundwater hot spots were to be addressed using a pump and treat system. The exact size and other design and operating parameters for the pump and treat system were to be finalized after the size, extent and level of contamination of the hot spots were characterized. After the water was pumped out, it would pass through activated carbon where the VOCs would be removed. After treatment, the water would be reinjected into the aquifer.

For areas of the downgradient plume where contamination was present, and where there were no hot spots, a MNA program would be established.

ROD for OU2

During the RI for OU1, a small area of VOC-impacted soil was found in the unsaturated zone to the east of the former Waste Storage Tank Area. This soil became a separate operable unit, OU2.

The RAO for OU2 was to reduce the concentration of PCE and TCE in the soil to levels at which they would no longer be a source of groundwater contamination.

POST ROD ACTIVITIES
Construction and Operation of AS/SVE systems

Source area

The remedies for the OU1 and OU2 RODs required construction of a AS/SVE system for the OU1 source area and an SVE system for OU2. Since these areas are near each other, the remedies were constructed at the same time and they share the same equipment. The full AS/SVE (OU1 and OU2) system began operation in February 2013. The system is monitored continually and has been shown to be very effective in removing contamination in the OU1 source area. At the present time, the system is periodically pulsed to increase its efficiency.

At the time of the OU1 ROD, the highest groundwater contamination values were found in source area wells near the Former Waster Storage Tank area where the PCE concentration was 4,200 µg/L and the TCE concentration was 2,100 µg/L (March 2006 data). The December 2017 monitoring data show that total VOCs in the source area monitoring wells are now less than 5 µg/L. The AS/SVE system continues to operate to achieve the cleanup goals selected in the OU1 ROD.

The SVE system for OU2 soil has also been successful in

achieving the cleanup goals, which for PCE is 2.6 milligram/kilogram (mg/kg) and for TCE is 14.0 mg/kg. Soil sampling in April 2017 identified just one small area which exceeded these goals. The SVE system was optimized and three new SVE wells were added to address this area. As of April 2019, the concentrations remain above the goal only in this one area and the SVE system continues to operate.

Predesign Investigation (PDI) for Hot Spots

Sampling of the downgradient groundwater monitoring wells at the end the RI for OU1 in 2006 and 2007 showed that concentrations of TCE and PCE had decreased compared to the earlier sampling events and the hot spots identified earlier appeared smaller.

Based on this observation, additional groundwater samples were taken along two transects in July 2007. Figure 1 shows the groundwater plume, including the hot spots as it existed at the conclusion of sampling for the OU1 RI.

As required by the OU1 ROD, pre-design investigations (PDI) began in 2011 to better define the hot spots and design the extraction and treatment system. The results of the 2011 sampling event showed that the hot spots were limited in area and depth. The one PCE hot spot was estimated to contain approximately 0.2 pounds of PCE and the four TCE hot spots were estimated to contain a total of 1.0 pound of TCE. The hot spots appeared to have moved slightly to the west and three new monitoring wells and two new "sentinel wells" (wells outside the area of contamination to determine if the contamination was spreading) were added to the existing network of monitoring wells.

Quarterly sampling of all the groundwater monitoring wells has taken place from 2013 to the present. Results show that the concentrations of the contaminants and the size of the impacted areas have been decreasing. Beginning in 2016, the groundwater data show that although a few locations still have elevated PCE or TCE values, none of the locations show PCE or TCE values greater than 100 µg/L, the definition of a hot spot in the OU1 ROD. The December 2017 data show that the hot spots, as defined areas, no longer exist and the highest measured concentration of PCE and TCE are 77 and 57 µg/L, respectively. The 2018 data show these values continue to decline (Figures 2 and 3, PCE and TCE plume maps using 2011 data and Figures 4 and 5, PCE and TCE maps from 2017)

In January 2019, the PRPs submitted an application for a Classification Exception Area/Well Restriction Area to NJDEP.

Evidence for Natural Attenuation

Natural attenuation is defined as the reliance on natural physical, biological or chemical in situ processes to reduce the mass, toxicity mobility, volume or concentration of chemicals in groundwater. These processes include biodegradation, dispersion, dilution, sorption, volatilization stabilization, transformation and destruction. During MNA, these natural processes are monitored through regular sampling for the original contaminants (PCE and TCE), their degradation products and other parameters, such as pH and dissolved oxygen, to show that attenuation is progressing.

Analytical results from sampling events during and after the RI confirm the presence of natural attenuation parameters indicating that there is biodegradation in the source area and in the downgradient plumes. In the source area, the biodegradation is anaerobic, whereas in the downgradient area the process is more aerobic. In the downgradient groundwater area, biodegradation is demonstrated through the presence of the cis-1,2-DCE, which is a degradation product of both PCE and TCE. The concentration of cis-1,2-DCE is higher in the downgradient wells than the concentration of PCE or TCE. In the hot spot area, the aerobic biodegradation of these compounds does not follow the most common pathway. Instead, the aerobic biodegradation of PCE, TCE and cis-1,2-DCE follows an oxygenase co-metabolic pathway to carbon dioxide.

Solute transport modelling was conducted to show the effects of natural processes such as advection, dispersion and sorption on the contaminants and estimate the time it would take to achieve the cleanup goals. In addition, an Advective Flushing Model was used to evaluate the timeframe required for an extraction and treatment system to achieve the groundwater cleanup goals. The modelling showed that both the extraction and treatment system and MNA would take about 15 years to achieve the cleanup goals.

Principal Threat Waste

Groundwater, which is the subject of this proposed ROD Amendment, is not considered a principal threat waste.

SUMMARY OF SITE RISKS

Human Health Risk Assessment

As part of the RI/FS, EPA conducted a baseline risk assessment to estimate the current and future effects of contaminants on human health and the environment. A baseline risk assessment is an analysis of the potential adverse human health and ecological effects of releases of

hazardous substances from a site in the absence of any actions or controls to mitigate such releases, under current and future land, groundwater and surface water/sediment uses. The baseline risk assessment includes a human health risk assessment (HHRA) and a screening level ecological risk assessment.

Based on the current zoning and anticipated future use, the risk assessment focused on a variety of possible receptors, including current and future commercial/industrial workers and future residents (child and adult).

Although residents and businesses downgradient are not currently impacted, groundwater is designated by the State as a potable water supply, meaning it could be used for drinking in the future. Therefore, potential exposure to groundwater was evaluated. A complete discussion of the exposure pathways and estimates of risk can be found in the *Human Health Risk Assessment* for the site in the Administrative Record.

The individual lifetime excess cancer risk estimate for the potential future site worker was 6.9×10^{-2}, which exceeds EPA's acceptable risk range of 10^{-4} to 10^{-6}. The calculated hazard index (HI) for noncancer health effects was 556, which exceeds EPA's threshold value of 1. The lifetime excess cancer risk estimate for the future adult resident and child resident were 2.6×10^{-2} and 4.6×10^{-2} respectively. The calculated HI for the adult resident and child resident were 1243 and 183, respectively. The unacceptable risks and hazards were primarily attributed to TCE and PCE in groundwater.

EPA evaluated the potential for vapor intrusion from contamination volatilizing from the groundwater plumes. Since there were no structures above the plumes and the contaminated groundwater lay under a barrier of clean water, there was no potential for vapor intrusion. At this time, there are still no structures above the plumes, the level of contamination in the groundwater has decreased, and the barrier of clean water is still present, therefore, there is still no potential for vapor intrusion.

The OU1 HHRA concluded that there was an unacceptable risk to future site workers and residents (children and adults) from exposure to groundwater. Although municipal water is supplied to all residents and businesses in the area, based on the maximum detected collected in 2017, 77 µg/L for PCE and 67 µg/L for TCE, there is still an unacceptable potential future risk to workers and residents if the groundwater were to be used for drinking. Additionally, concentrations of TCE, PCE and their degradation products continue to exceed the New Jersey Class 1-PL standards.

WHAT IS RISK AND HOW IS IT CALCULATED?

A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current- and future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

Hazard Identification: In this step, the contaminants of concern at the site in various media (i.e., soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

Exposure Assessment: In this step, the different exposure pathways through which people might be exposed to the contaminants identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil. Factors relating to the exposure assessment include, but are not limited to, the concentrations that people might be exposed to and the potential frequency and duration of exposure. Using these factors, a "reasonable maximum exposure" scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

Toxicity Assessment: In this step, the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response) are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other non-cancer health effects, such as changes in the normal functions of organs within the body (e.g., changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and non-cancer health effects.

Risk Characterization: This step summarizes and combines exposure information and toxicity assessments to provide a quantitative assessment of site risks. Exposures are evaluated based on the potential risk of developing cancer and the potential for noncancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a "one-in-ten-thousand excess cancer risk"; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions explained in the Exposure Assessment. Current Superfund guidelines for acceptable exposures are an individual lifetime excess cancer risk in the range of 10^{-4} to 10^{-6} (corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk). For noncancer health effects, a "hazard index" (HI) is calculated. An HI represents the sum of the individual exposure levels compared to their corresponding reference doses. The key concept for a noncancer HI is that a "threshold level" (measured as an HI

Screening Level Ecological Risk Assessment

A Screening Level Ecological Risk Assessment to determine potential risk to ecological receptors was evaluated as part of the OU1 baseline risk assessment. At that time there was no unacceptable ecological risk to the aquatic community associated with this site. Therefore, groundwater to surface water discharge was not considered to be of ecological concern. The groundwater to surface water discharge conditions at the Site have not changed. Therefore, at this time, no further ecological risk assessment is warranted.

Based on the residual levels of groundwater contamination in the former hot spot areas, EPA has determined that there remains a need for remediation. It is EPA's current judgment that the Preferred Amended groundwater remedy identified in this Proposed Plan, or one of the other measures considered in the Proposed Plan, is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

REMEDIAL ACTION OBJECTIVES AND CLEANUP GOALS

EPA is not proposing to modify the groundwater RAOs or the cleanup goals selected in the OU1 ROD.

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA, Section 121(b)(1), 42 U.S.C. Section 9621(b)(1), mandates that remedial actions must be protective of human health and the environment, cost-effective and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants at a site. CERCLA, Section 121(d), 42 U.S.C. Section 9621(d) further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains applicable or relevant and appropriate requirements (ARARs) under federal and state laws, unless a waiver can be justified pursuant to CERCLA Section 121(d)(4), 42 U.S.C. Section 9621(d)(4).

EPA is proposing to modify the remedy selected in the OU1 ROD from extraction and treatment to MNA in the area where the hot spots were formerly detected because the source of groundwater contamination is being addressed through operation of the AS/SVE system and the hot spots can no longer be detected. Other components of the remedy, including the AS/SVE system, MNA for the remaining portions of the plume and establishment of a CEA, are not affected by this proposed plan.

A description of MNA and extraction and treatment (pump and treat systems) can be found at the following EPA sponsored web sites:

For Monitored Natural Attenuation:
http://www.cluin.org/download/citizens/mna.pdf

For Extraction and Treat Systems:
http://www.cluin.org/download/citizens/pump_and_treat.pdf

A more complete description of the alternatives can be found in the Focused Feasibility Study that is part of the Administrative Record.

The timeframes presented below for construction do not include the time for pre-design investigations, remedial design, or contract procurements. Each of the hot spot alternatives will take longer than five years to achieve RAOs. Therefore, a Five-Year Review will continue to be conducted for OU1until cleanup goals are achieved.

Original Remedy –Downgradient Extraction and Treat of the Hot Spots, with MNA and Institutional Controls

As selected in the OU1 ROD in 2009, any hot spots identified in the downgradient area in the plumes would be remediated by an extraction and treat system. At the time of the 2009 ROD, hot spots were identified in the down gradient groundwater (Figure 1). For the purpose of this evaluation remedy components for the groundwater hotspots in the downgradient portion of the eastern and western groundwater plumes are assumed to be unchanged.

In an extraction and treat system, an appropriate number of wells are placed in the contaminated groundwater. If this component of the original remedy were to be implemented, the contaminated groundwater would be pumped out and treated to remove contaminants, and the treated water would be reinjected into the aquifer.

Total Capital Cost	$925,000
Total Present New Worth (including O&M)	$2,160,000
Time to meet RAOs	15 Years

Preferred Alternative –Monitored Natural Attenuation of the Hot Spots

MNA refers to the reliance on natural attenuation processes to achieve Site-specific RAOs and cleanup goals within a

time-frame that is reasonable compared to that offered by other more active methods.

MNA would require long-term monitoring for PCE and TCE, their degradation products and additional groundwater quality parameters to monitor the degradation process as the contaminants attenuate.

The data confirm that operation of the groundwater AS/SVE system has reduced the levels of contamination in the source areas to the point where they are not acting as a significant source of contamination to downgradient groundwater. Monitoring of the groundwater in the area of the hot spots confirm that PCE and TCE concentrations have been decreasing and that the former hot spots (i.e., PCE or TCE are greater than 100 µg/L) no longer exist as discrete areas. As of September 2018, the highest contamination values at a monitoring well within the former hot spot areas was 43 µg/L for PCE and 19 µg/L for TCE.

An MNA remedy for the hot spot areas would use the existing monitoring and sentinel well network to evaluate concentrations of PCE, TCE and their degradation products over time to ensure that RAOs are achieved in a reasonable time frame (15 years) at the Site.

Total Capital Cost (annual monitoring)	$14,508
Total Present Net Worth	$150,000
Time to meet RAOs	15 years

EVALUATION OF REMEDIAL ALTERNATIVES

Nine criteria are used to evaluate the different remedial alternatives individually and against each other in order to select the best alternative. The criteria are described in the box on the following page. This section of the Proposed Plan profiles the relative performance of each alternative against the nine criteria, noting how it compares to the other options under consideration. The nine evaluation criteria are discussed below. A more detailed analysis of the presented alternatives can be found in the Focused Feasibility Study which is part of the Administrative Record.

Threshold Criteria

Overall Protection of Human Health and the Environment

The Preferred Alternative, MNA, would be protective. The plumes would continue to be monitored for PCE, TCE, their degredation products and MNA parameters using the existing well network. Based on previous sampling events, it is predicted that the concentrations of contaminants will continue to decrease.

The Original Remedy, extraction and treatment, would be protective as it would provide continual monitoring and active treatment of the near downgradient groundwater.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Both alternatives are expected to comply with the groundwater ARARs, the New Jersey Class I-PL standards

THE NINE SUPERFUND EVALUATION CRITERIA

1. Overall Protectiveness of Human Health and the Environment evaluates whether and how an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) evaluates whether the alternative meets federal and state environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.

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

4. Reduction of Toxicity, Mobility, or Volume (TMV) of Contaminants through Treatment 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.

5. Short-term Effectiveness considers the length of time needed to implement an alternative and the risks the alternative poses to workers, the community, and the environment during implementation.

6. Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

7. Cost includes estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

8. State/Support Agency Acceptance considers whether the State agrees with the EPA's analyses and recommendations, as described in the RI/FS and Proposed Plan.

***9.* Community Acceptance** considers whether the local community agrees with EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

in a reasonable time frame. The estimated time frame for both alternatives to achieve restoration of the groundwater to its beneficial use as a drinking water source is 15 years.

Balancing Criteria

Long-Term Effectiveness and Permanence

Both alternatives would be effective and permanent in the long term. The contamination in the source areas has been greatly reduced through operation of the AS/SVE system. The reduction in concentrations of the hot spot contaminants has occurred due to natural attenuation processes. MNA is demonstrably occuring, showing that it is effective, and the results would be permanent. The Original Remedy would be a combination of MNA and treatment and would also be effective in the long-term and permanent. However, the additional benefit, if any, from the treatment would be minimal. While it may be possible to remove some of the mass of contaminants in the remaining small areas of elevated groundwater contamination, it is unlikely that sufficient contamination will be removed to reach the cleanup goals through extraction alone.

Reduction of Toxicity, Mobility, or Volume Through Treatment

The Preferred Alternative, MNA would not reduce the toxicity, mobility and volume of contaminants in the groundwater through treatment. The Original Remedy would employ treatment to reduce the toxicity, mobility and volume of contaminants in the hot spot areas.

Short-Term Effectiveness

The Preferred Alternative is effective in the short term because the natural attenuation of PCE and TCE in groundwater is occurring at OU1 and the hot spots can no longer be detected.

The Original Remedy would be less effective in the short term because before the extraction and treatment system can be built it will be necessary to get access agreements from the impacted property owners, conduct sampling to determine the specific design parameters for the system and then design and construct the system. While the predesign sampling and construction of the system occur, there may be short-term negative impacts on the involved properties.

Implementability

The well network for groundwater monitoring for the Preferred Alternative is currently in place and, therefore, would require no further effort to implement. Access agreements are already in place to periodically take groundwater samples.

The Original Remedy is less implementable since it would include the construction of pipelines, wells, and a treatment system on one or more private properties. New access agreements would have to be negotiated with the nearby property owners in order to construct the system. The access would be used to obtain more data to design the system. Access would also be necessary to construct and operate the system.

Cost

The present-worth costs for MNA and extraction and treatment are calculated based on each alternative's estimated timeframes to achieve groundwater RAOs. The present worth cost for MNA ($150,000) is significantly lower than for the extraction and treatment system ($2,106,000).

Modifying Criteria

State/Support Agency Acceptance

The proposed modification to the remedy selected in the OU1 ROD is currently being reviewed by the State of New Jersey.

Community Acceptance

Community acceptance of the Preferred Alternative will be evaluated after the public comment period ends and will be described in the Responsiveness Summary of the Record of Decision Amendment for this Site.

SUMMARY OF THE PREFERRED ALTERNATIVE

The Preferred Alternative to modify the remedy selected in the OU1 ROD for the hot spot areas is MNA. Monitoring results from 2016 to the present show that hot spots no longer exist as discrete areas in the downgradient portions of the eastern and western groundwater plumes through the natural attenuation of PCE and TCE. The existing monitoring and sentinel well network will be used to continue to evaluate concentrations of TCE, PCE and their degradation products to ensure that groundwater is restored to its beneficial use as a source of drinking water in a reasonable timeframe.

In addition, operation of the OU1 AS/SVE system will continue as will monitoring of natural attenuation processes in the groundwater plumes outside of the former the hot spot areas MNA throughout the plumes will continue until

the OU1 groundwater cleanup goals have been attained.

Institutional Controls such as a CEA will be established as required by the OU1 ROD and will remain in place until the cleanup goals are achieved. EPA will conduct Five Year Reviews as required in the OU1 ROD.

Consistent with EPA Region 2's Clean and Green policy, EPA will evaluate the use of sustainable technologies and practices with respect to any remedial alternative selected for the Site.

The Preferred Alternative satisfies the threshold criteria and achieves the best combination of the five balancing criteria of the comparative analysis. MNA is preferred because it will achieve the RAOs and cleanup goals in the same amount of time as the Original Remedy and is less disruptive and less costly. EPA expects the Preferred Alternative to satisfy the following statutory requirements of CERCLA, section 121: 1) be protective of human health and the environment; 2) comply with ARARs; 3) be cost-effective; 4) utilize permanent solutions and alternative treatment technologies or resource recover technologies to the maximum extent practicable. Although the Preferred Alternative does not satisfy the preference for treatment as a principal element, it will reduce concentrations in the same amount of time as the active alternative.

COMMUNITY PARTICIPATION

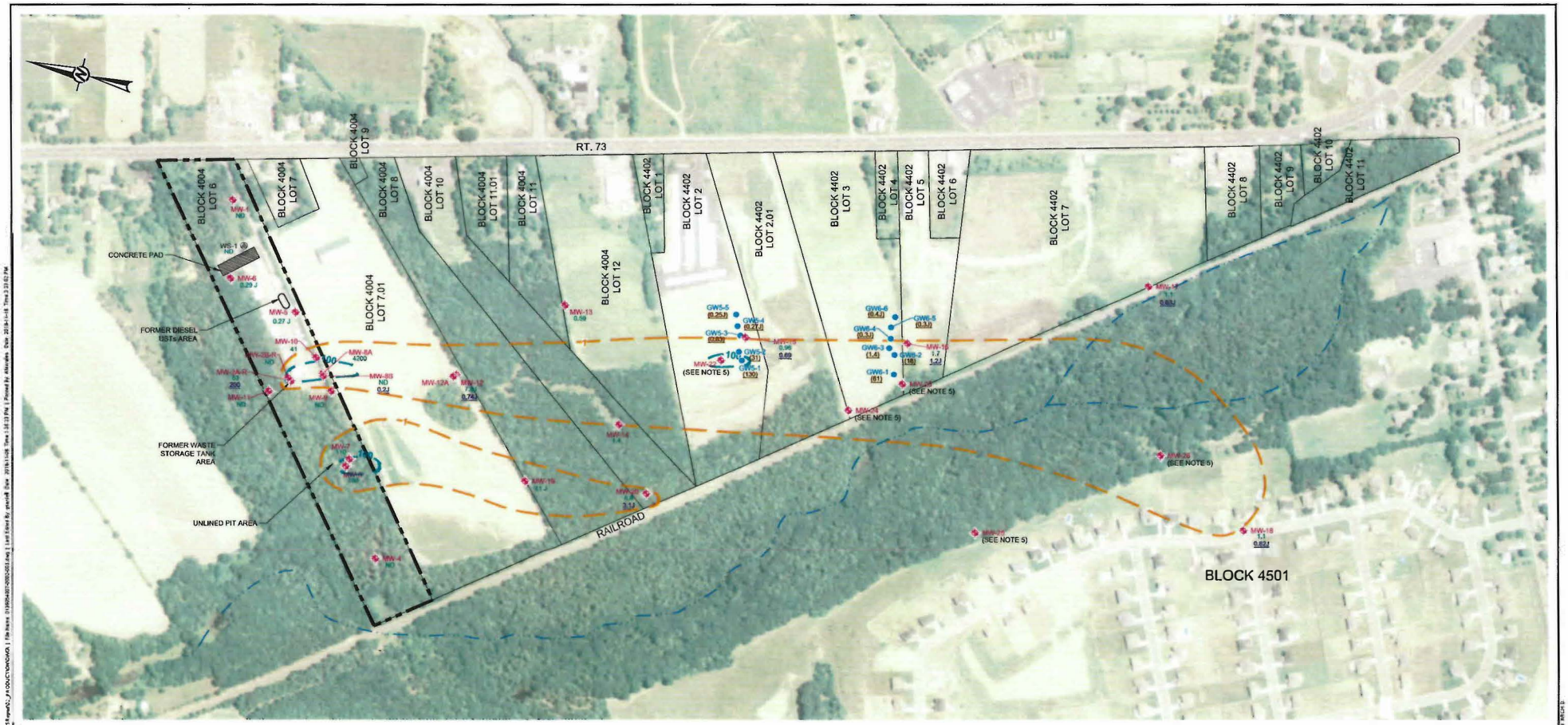
EPA provided information regarding the cleanup of the Lightman Drum Superfund Site to the public through public meetings, the Administrative Record file for the Site and announcements published in the Courier-Post newspaper. EPA encourages the public to gain a more comprehensive understanding of the Site and the Superfund activities that have been conducted there.

For further information on EPA's preferred alternative for the Lightman Drum Superfund Site:

Renee Gelblat	Natalie Loney
Remedial Project Manager	Community Relations
(212) 637-4414	(212) 637-3639

U.S. EPA
290 Broadway, 19th Floor
New York, New York 10007-1866 or online at
https://www.epa.gov/superfund/lightman-drum

The dates for the public comment period; the date, the location and time of the public meeting; and the locations of the Administrative Record files are provided on the front page of this Proposed Plan.



0 200 400
1" = 200' FEET

LEGEND

- APPROXIMATE PROPERTY LINE- LIGHTMAN DRUM SITE
- PUMP BRANCH CREEK (SEE NOTE 1)
- 1 PCE 1 ug/L ISOCONCENTRATION CONTOUR (2002-2005)
- 100 PCE ISOCONCENTRATION CONTOUR IN AREAS ABOVE 100 UG/L
- ONSITE WATER SUPPLY WELL (LOCATION APPROXIMATE)
- MONITORING WELL
- GEOPROBE AQUIFER PROFILE BORING (2007)
- PCE CONCENTRATIONS (ug/L) FOR MARCH 2006
- PCE CONCENTRATIONS (ug/L) FOR FEBRUARY 2007
- GEOPROBE PCE CONCENTRATIONS (ug/L) FOR JULY 2007

NOTE(S)

1. APPROXIMATE CREEK LOCATION ESTIMATED FROM 1995 AERIAL PHOTO. EPHEMERAL IN VICINITY OF LIGHTMAN PROPERTY.
2. MW-2A, MW-2B AND MW-21 WERE DECOMMISSIONED DURING SOURCE REMOVAL ACTION ACTIVITIES IN NOVEMBER 2007. REPLACEMENT WELLS MW-2A-R AND MW-2B-R WERE INSTALLED IN FEBRUARY 2008.
3. AQUIFER PROFILE BORING LOCATIONS ARE APPROXIMATE.
4. ALL GEOPROBE PCE CONCENTRATIONS WERE THE MAXIMUM CONCENTRATION DETECTED. THIS DEPTH WAS 53-55 FT. BGS. IN GW6-2 AND IN ALL OTHERS WAS 63'-65' FT. BGS.
5. INSTALLED IN 2012.
6. ND = NOT DETECTED

REFERENCE(S)

1. AERIAL PHOTOGRAPH TAKEN FROM USDA GEOSPATIAL DATA GATEWAY. DATED 2006.
2. MONITORING WELLS SHOWN WERE BASED ON SURVEY INFORMATION SUPPLIED BY JAMES M. STEWART, INC. MW-2A-R AND MW-2B-R WERE SURVEYED BY JOHN P. HOUWEN PROFESSIONAL LAND SURVEYOR ON APRIL 8, 2008. MONITORING WELLS MW-12A, MW-22, MW-23, MW-24, MW-25, AND MW-26 FROM MONITORING WELL CERTIFICATION FORM B SURVEYED BY VARGO ASSOCIATES ON DECEMBER 26, 2012.
3. BLOCK 4402 AND BLOCK 4004 PARCEL BOUNDARIES FROM GIS DATABASE OF NEW JERSEY. BLOCK 4411 PARCEL BOUNDARY FROM DIGITAL FILE LIGHTMANDRUM_12-20-12_PL.DWG, SURVEYED BY VARGO ASSOCIATES.

CLIENT
LIGHTMAN YARD PRP GROUP

PROJECT
LIGHTMAN DRUM SITE
WINSLOW TOWNSHIP, NEW JERSEY
RI/FFS REPORT

TITLE
PCE 2006-2007 REMEDIAL INVESTIGATION

CONSULTANT
GOLDER

YYYY-MM-DD	2018-11-16
DESIGNED	NAM
PREPARED	GLS
REVIEWED	HAL
APPROVED	RJI

PROJECT NO.	CONTROL	REV.	FIGURE
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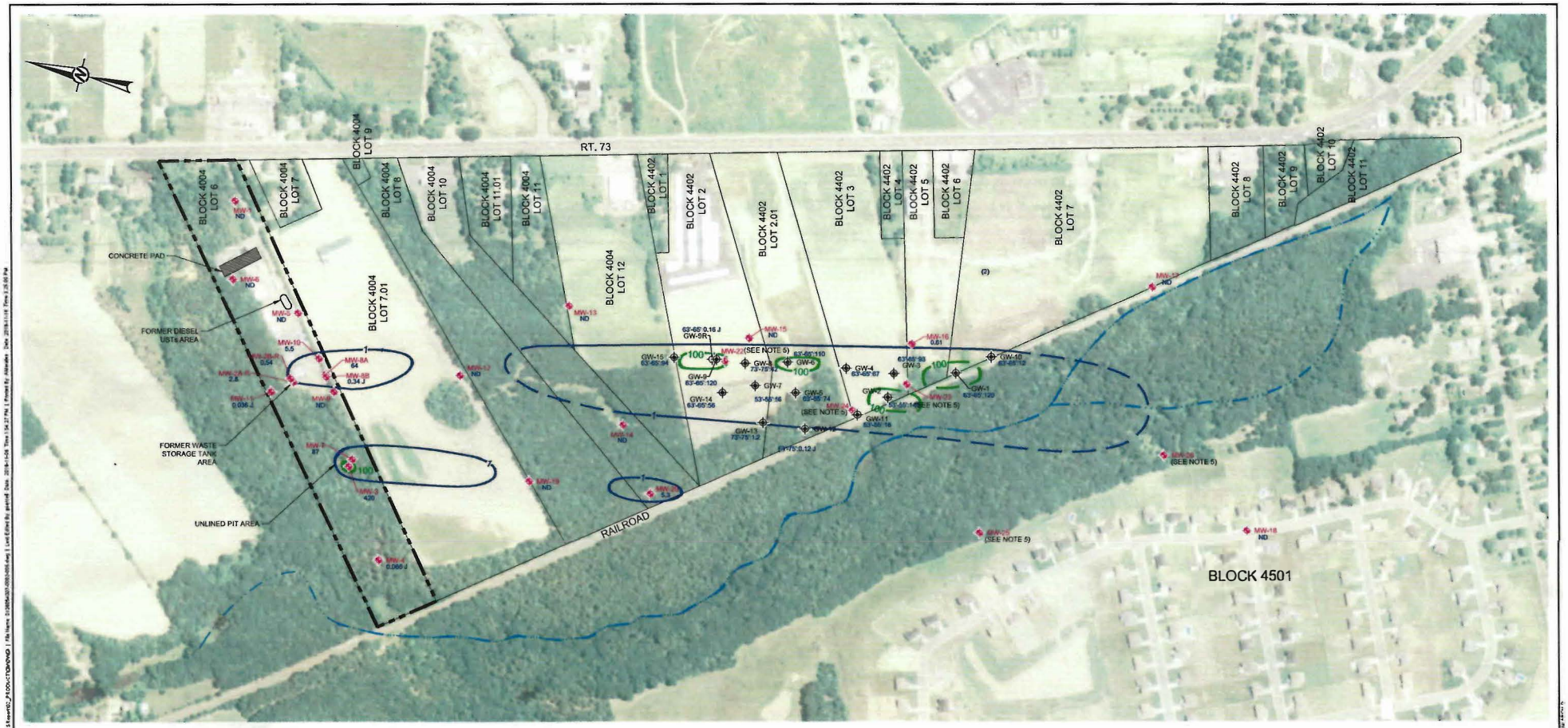

LEGEND

- APPROXIMATE PROPERTY LINE - LIGHTMAN DRUM SITE
- PUMP BRANCH CREEK (SEE NOTE 1)
- 1 — TCE 1 ug/L ISO-CONCENTRATION CONTOUR
- 100 — TCE ISO-CONCENTRATION CONTOUR IN AREAS ABOVE 100 ug/L
- MONITORING WELL
- AQUIFER PROFILE BORING
- 63-65' 94 — DEPTH (FT BGS) TCE CONCENTRATION (ug/L)
- 87 — JUNE 2011 TCE CONCENTRATION (ug/L)

NOTE(S)

1. APPROXIMATE CREEK LOCATION ESTIMATED FROM 1995 AERIAL PHOTO. EPHEMERAL IN VICINITY OF LIGHTMAN PROPERTY.
2. TPZ-4 WAS DECOMMISSIONED ON AUGUST 24, 2011.
3. MAXIMUM CONCENTRATION FROM EACH AQUIFER PROFILE BORING IS SHOWN.
4. DUE TO LOSS OF A ROD IN BORING GW-9, THE DEEPEST SAMPLE WAS COLLECTED AT ADJACENT GW-9R @ 63-65 FT BGS.
5. INSTALLED IN 2012.
6. ND = NOT DETECTED

REFERENCE(S)

1. AERIAL PHOTOGRAPH TAKEN FROM USDA GEOSPATIAL DATA GATEWAY, DATED 2006.
2. MONITORING WELLS SHOWN WERE BASED ON SURVEY INFORMATION SUPPLIED BY JAMES M. STEWART, INC.
3. GEOPROBE PROFILE BORINGS AND SURFACE WATER/SEDIMENT SAMPLING LOCATIONS WERE LOCATED IN THE FIELD BY GOLDER ASSOCIATES, INC. PERSONNEL USING A HANDHELD GPS UNIT AND ARE APPROXIMATE ONLY.
4. PARCEL BOUNDARIES FROM GIS DATABASE OF NEW JERSEY.
5. AQUIFER PROFILE BORINGS LOCATED VIA GARMING ETREX VISTA HCX GPS, BY GOLDER FIELD PERSONNEL IN AUGUST 2011.
6. REPLACEMENT MONITORING WELLS MW-2A-R AND MW-2B-R SURVEYED ON APRIL 01, 2008 BY B & B HI-TECH SOLUTIONS, LLC.

0 200 400
1" = 200' FEET

CLIENT
LIGHTMAN YARD PRP GROUP

PROJECT
LIGHTMAN DRUM SITE
WINSLOW TOWNSHIP, NEW JERSEY
RI/FFS REPORT

TITLE
TCE 2011 PRE-DESIGN INVESTIGATION

CONSULTANT
GOLDER

YYYY-MM-DD	2018-11-16
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PREPARED	GLS
REVIEWED	HAL
APPROVED	RJI

PROJECT NO.	CONTROL	REV.	FIGURE
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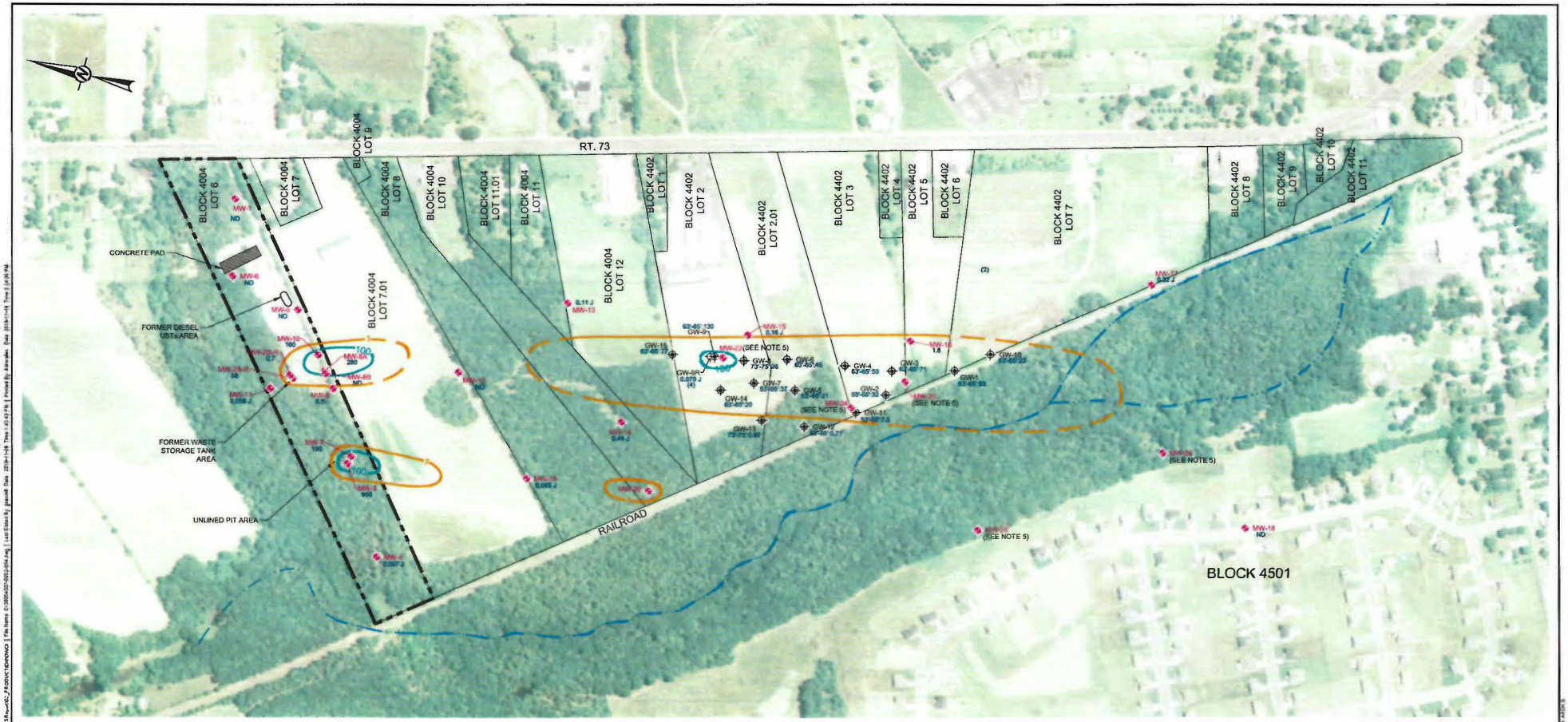

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1" = 200' FEET

LEGEND

- APPROXIMATE PROPERTY LINE - LIGHTMAN DRUM SITE
- PUMP BRANCH CREEK (SEE NOTE 1)
- PCE 1 ug/L ISO-CON CENTRATION CONTOUR
- 100 PCE ISO-CONCENTRATION CONTOUR IN AREAS ABOVE 100 ug/L
- MONITORING WELL
- AQUIFER PROFILE BORING
- 63-65' 77 DEPTH (FT-BGS) PCECONCENTRATION (ug/L)
- 190 JUNE 2011 PCE CONCENTRATION(ug/L)

NOTE(S)

1. APPROXIMATE CREEK LOCATION ESTIMATED FROM 1995 AERIAL PHOTO EPHEMERAL IN VICINITY OF LIGHTMAN PROPERTY
2. TPZ-4 WAS DECOMMISSIONED ON AUGUST 24 2011
3. MAXIMUM CONCENTRATION FROM EACH AQUIFER PROFILE BORING IS SHOWN.
4. DUE TO LOSS OF ROD IN BORING GW-9 THE DEEPEST SAMPLE WAS COLLECTED AT ADJACENT GW-9R @ 83-85 FT. BGS
5. INSTALLED IN 2012
6. ND = NOT DETECTED

REFERENCE(S)

1. AERIAL PHOTOGRAPH TAKEN FROM USDA GEOSPATIAL DATA GATEWAY. DATED 2006
2. MONITORING WELLS SHOWN WERE BASED ON SURVEY INFORMATION SUPPLIED BY JAMES M. STEWART, INC
3. GEOPROBE PROFILE BORINGS AND SURFACE WATER/SEDIMENT SAMPLING LOCATIONS WERE LOCATED IN THE FIELD BY GOLDER ASSOCIATES, INC. PERSONNEL USING A HANDHELD GPS UNIT AND ARE APPROXIMATE ONLY.
4. PARCEL BOUNDARIES FROM GIS DATABASE OF NEW JERSEY.
5. AQUIFER PROFILE BORINGS LOCATED VIA GARMING ETREX VISTA HCX GPS BY GOLDER FIELD PERSONNEL IN AUGUST 2011.
6. REPLACEMENT MONITORING WELLS MW-2 AR AND MW-2B-R SURVEYED ON APRIL 01, 2008 BY B & B HI-TECH SOLUTIONS LLC

CLIENT
LIGHTMAN YARD PRP GROUP

PROJECT
LIGHTMAN DRUM SITE
WINSLOW TOWNSHIP, NEW JERSEY
RI/FFS REPORT

TITLE
PCE 2011 PRE-DESIGN INVESTIGATION

CONSULTANT
GOLDER

YYYY-MM-DD	2018-11-16
DESIGNED	NAM
PREPARED	GLS
REVIEWED	HAL
APPROVED	RJI

PROJECT NO.	CONTROL	REV.	FIGURE
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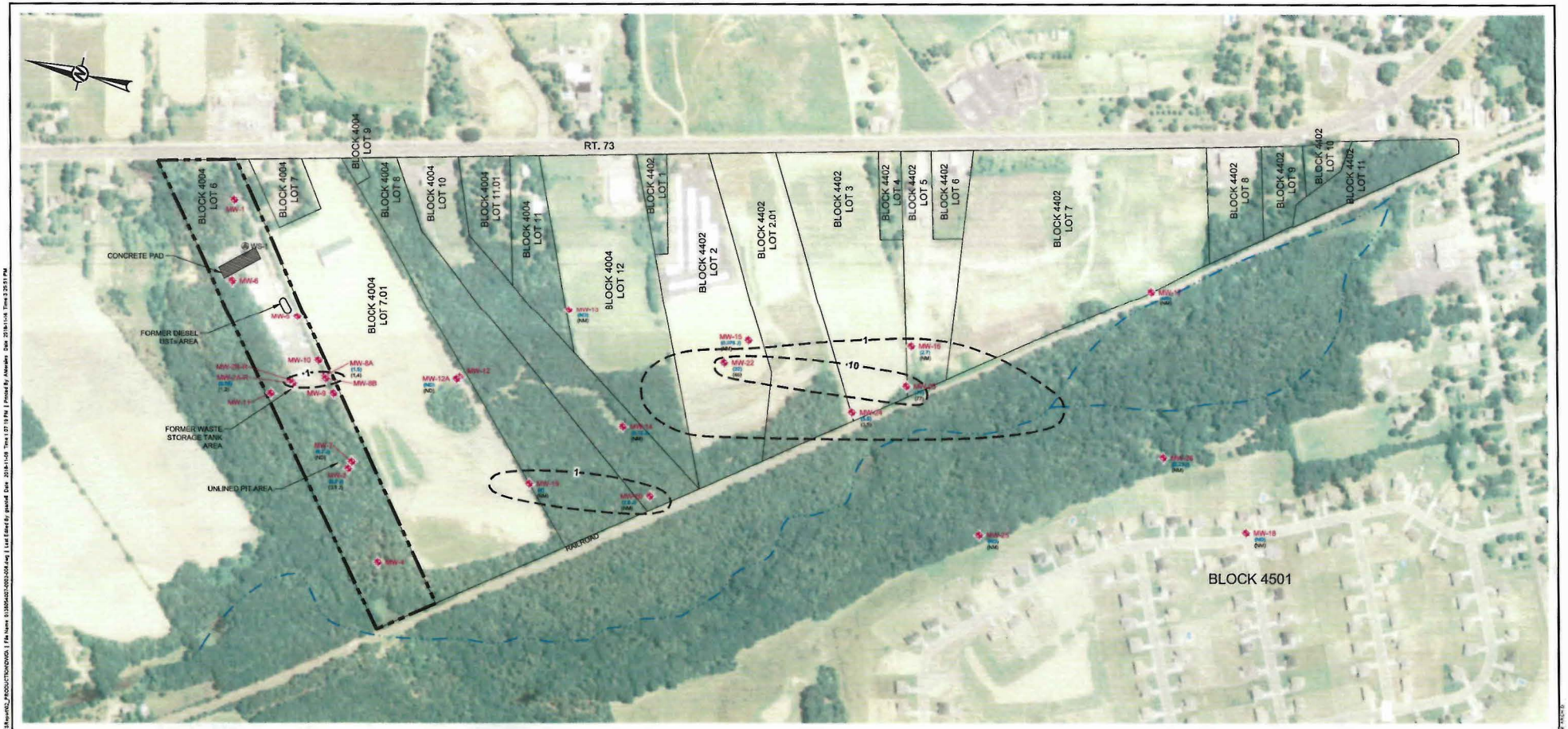

0 200 400
1" = 200' FEET

LEGEND

- APPROXIMATE PROPERTY LINE - LIGHTMAN CRUMSITE
- PUMP BRANCH CREEK (SEE NOTE 1)
- 1 — PCE 1 ug/L ISO-CONCENTRATION CONTOUR (2017)
- (2.2J) PCE CONCENTRATION (DECEMBER 2017) ug/L
- (1.5) PCE CONCENTRATION (SEPTEMBER 2017) ug/L
- ONSITE WATER SUPPLY WELL (LOCATION APPROXIMATE)
- MONITORING WELL

NOTE(S)

1. APPROXIMATE CREEK LOCATION ESTIMATED FROM 1995 AERIAL PHOTO. EPHEMERAL IN VICINITY OF LIGHTMAN PROPERTY.
2. MW-2A, MW-2B, AND MW-21 WERE DECOMMISSIONED DURING SOURCE REMOVAL ACTION ACTIVITIES IN NOVEMBER 2007. REPLACEMENT WELLS MW-2A-R AND MW-2B-R WERE INSTALLED IN FEBRUARY 2008.
3. ND = NOT DETECTED
4. NM = NOT MEASURED

REFERENCE(S)

1. AERIAL PHOTOGRAPH FROM TAKEN FROM USDA GEOSPATIAL GATEWAY, DATED 2005.
2. MONITORING WELLS SHOWN WERE BASED ON SURVEY INFORMATION SUPPLIED BY JAMES M. STEWART, INC. MW-2A-R AND MW-2B-R WERE SURVEYED BY JOHN P. HOUWEN PROFESSIONAL LAND SURVEYOR ON APRIL 8, 2008. MONITORING WELLS MW-12A, MW-22, MW-23, MW-24, MW-25, AND MW-26 FROM MONITORING WELL CERTIFICATION FORM B SURVEYED BY VARGO ASSOCIATES ON DECEMBER 26, 2012.
3. BLOCK 4402 AND BLOCK 4004 PARCEL BOUNDARIES FROM GIS DATABASE OF NEW JERSEY. BLOCK 4411 PARCEL BOUNDARY FROM DIGITAL FILE LightmanDrum_12-20-12_PL.dwg SURVEYED BY VARGO ASSOCIATES.

CLIENT
LIGHTMAN YARD PRP GROUP

PROJECT
LIGHTMAN DRUM SITE
WINSLOW TOWNSHIP, NEW JERSEY
RI/FFS REPORT

TITLE
PCE 2017 MONITORING

CONSULTANT
GOLDER

YYYY-MM-DD	2018-11-16
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APPROVED	RJI

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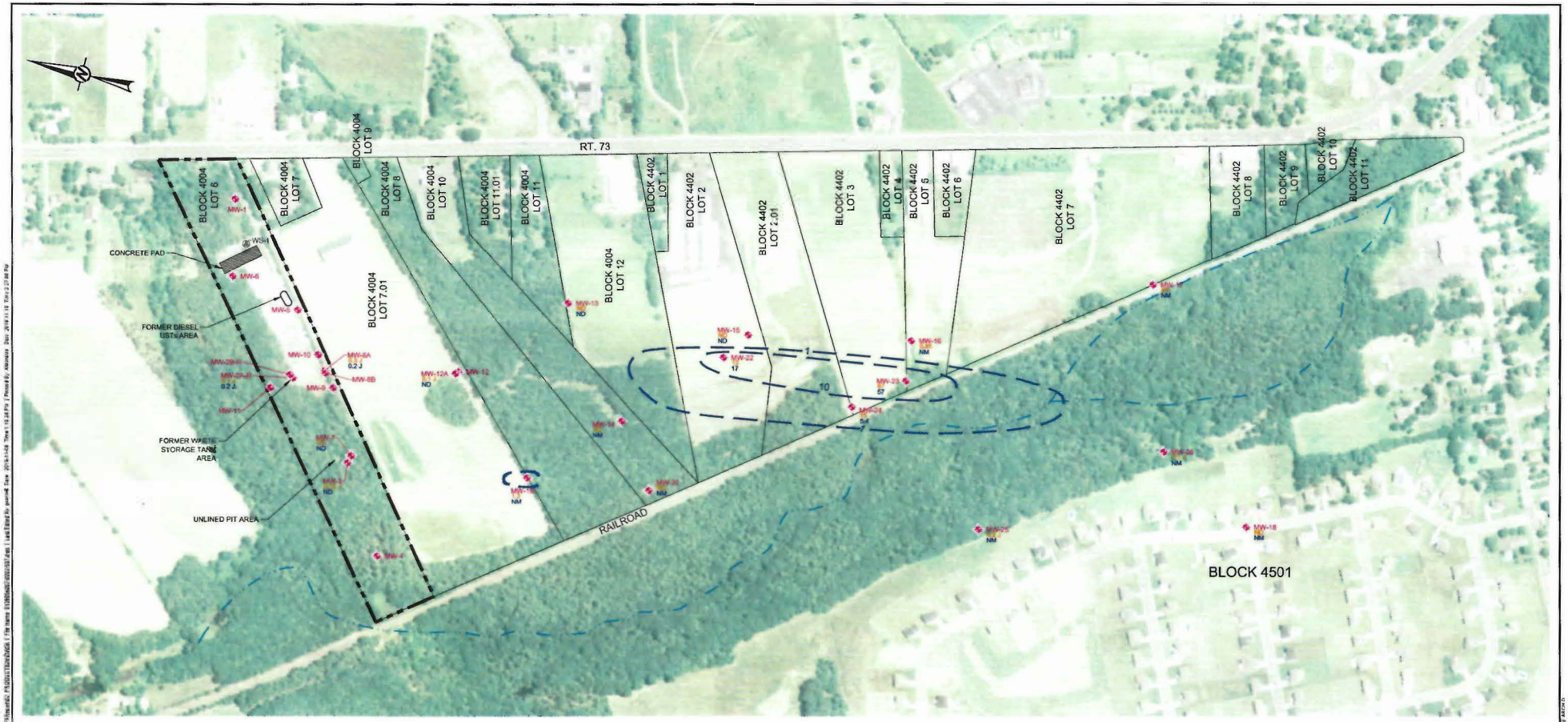

LEGEND

- APPROXIMATE PROPERTY LINE - LIGHTMAN DRUMSITE
- PUMP BRANCH CREEK (SEE NOTE 1)
- TCE 1 ug/L ISO-CONCENTRATION CONTOUR
- ONSITE WATER SUPPLY WELL (LOCATION APPROXIMATE)
- MONITORING WELL
- TCE CONCENTRATION (SEPTEMBER 2017) (ug/L)
- TCE CONCENTRATION (DECEMBER 2017) (ug/L)

NOTE(S)

1. APPROXIMATE CREEK LOCATION ESTIMATED FROM 1995 AERIAL PHOTO. EPHEMERAL IN VICINITY OF LIGHTMAN PROPERTY.
2. MW-2A, MW-2B, AND MW-21 WERE DECOMMISSIONED DURING SOURCE REMOVAL ACTION ACTIVITIES IN NOVEMBER 2007. REPLACEMENT WELLS MW-2A-R AND MW-2B-R WERE INSTALLED IN FEBRUARY 2008.
3. ND = NOT DETECTED
4. NM = NOT MEASURED

REFERENCE(S)

1. AERIAL PHOTOGRAPH FROM TAKEN FROM USDA GEOSPATIAL GATEWAY, DATED 2008
2. MONITORING WELLS SHOWN WERE BASED ON SURVEY INFORMATION SUPPLIED BY JAMES M. STEWART, INC. MW-2A-R AND MW-2B-R WERE SURVEYED BY JOHN P. HOUWEN PROFESSIONAL LAND SURVEYOR ON APRIL 8, 2008. MONITORING WELLS MW-17A, MW-22 MW-23, MW-24, MW-25, AND MW-26 FROM MONITORING WELL CERTIFICATION FORM 8 SURVEYED BY VARGO ASSOCIATES ON DECEMBER 26, 2012.
3. BLOCK 4402 AND BLOCK 4004 PARCEL BOUNDARIES FROM GIS DATABASE OF NEW JERSEY. BLOCK 4411 PARCEL BOUNDARY FROM DIGITAL FILE LIGHTMANDRUM_12-20-12_PL.DWG SURVEYED BY VARGO ASSOCIATES

CLIENT
LIGHTMAN YARD PRP GROUP

PROJECT
LIGHTMAN DRUM SITE
WINSLOW TOWNSHIP, NEW JERSEY
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