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September 4, 2024
File No. 01.0177641.10

Massachusetts Department of Environmental Protection
Southeast Regional Office
20 Riverside Drive
Lakeville, Massachusetts 023447

Re: Immediate Response Action (IRA) Plan Modification No. 4
Former Barnstable County Municipal Fire Training Facility
155 South Flint Rock Road
Barnstable, Massachusetts 02601
Release Tracking Number (RTN) 4-26179

To Whom It May Concern:

On behalf of Barnstable County (County), as represented by the Barnstable County Board of Regional Commissioners, GZA GeoEnvironmental, Inc. (GZA) has prepared this Immediate Response Action (IRA) Plan Modification for the above-referenced disposal site (the "Site"). The Massachusetts Department of Environmental Protection (MassDEP) identifies the disposal site as Release Tracking Number (RTN) 4-26179. The IRA is being performed to address a release of per- and polyfluoroalkyl substances (PFAS) related to historic activities at the former Barnstable County Municipal Fire Training Facility (MFTF) located at 155 South Flint Rock Road in Barnstable (Hyannis), Massachusetts.

This IRA Plan Modification has been prepared for the implementation of a pilot test of an in situ permeable reactive barrier (PRB). The PRB will consist of injection of Colloidal Activated Carbon (CAC) with the objective of evaluating the efficacy of CAC as a response action to mitigate further migration of PFAS from the Site.

A CAC PRB acts as a vertical permeable wall created below ground to treat and remediate contaminated groundwater. Absorbent (reactive) materials (in this case, a CAC product) are injected or otherwise emplaced into the ground surface thereby creating a barrier. The absorbent barrier allows groundwater to flow through it while PFAS are sorbed onto the CAC and treated water flows out the other side of the wall. A United States Environmental Protection Agency (USEPA) *Community Guide to Permeable Reactive Barriers* is included as **Appendix A** to this IRA Plan Modification.

While a PRB will not remove PFAS from the subsurface, it will serve to limit further migration of PFAS from the MFTF site and could, in conjunction with other remedial technologies, support the achievement of a Permanent or Temporary Solution, or Remedy Operation Status for the Site.

This IRA Plan Modification has been prepared in accordance with 310 CMR 40.0424, and 40.0046 of the Massachusetts Contingency Plan (MCP; 310 CMR 40.0000). This report is subject to the Limitations in **Appendix B**. The IRA Transmittal Form (BWSC105) was submitted electronically in accordance with the current MassDEP policy. A copy of this form is included in **Appendix C** of this report.

A Draft IRA Plan Modification was submitted to MassDEP on July 18, 2024, via eDEP using a BWSC105 transmittal form. In accordance with the Public Involvement Plan (PIP) previously

developed for the Site, PIP petitioners were notified of the availability of the Draft IRA Plan Modification for public comment via mail and/or email on July 19, 2024. A copy of the Draft IRA Plan Modification was made available for public viewing at the information repository for the disposal site established at the Hyannis Public Library, as well as MassDEP's online file viewer. Additionally, the Draft IRA Plan Modification was discussed during the July 25, 2024, public meeting. This IRA Plan Modification has been prepared to address public comments received on the Draft IRA Plan Modification; a summary of the public comments and GZA's response is provided in **Appendix D**.

BACKGROUND

The former Barnstable County MFTF is located at 155 South Flint Rock Road in Barnstable (Hyannis), Massachusetts. The MFTF is currently owned by the County of Barnstable, Massachusetts, and includes one primary building, the former fire training building (which houses administrative offices, former classrooms, and two apparatus bays), and several ancillary structures including a former classroom building (currently being used for storage), two Quonset-style sheds (also being used for storage), a small concrete building which houses a groundwater treatment system, a metal shipping container which houses a second groundwater treatment system, a small, vacant, concrete block storage shed, and associated paved driveways/parking areas, and landscaped areas. The MFTF is secured by a chain link fence and a locked gate. A Site Locus Plan is included as **Figure 1** and a Site Plan is included as **Figure 2**.

The MFTF has been used for public safety training by numerous fire departments and fire districts throughout Barnstable County and the Commonwealth since the 1950s. Fire-fighting training exercises, including the use of firefighting foams (including aqueous film-forming foam, AFFF) were conducted at the MFTF until operations ceased in 2009. AFFF is known to contain PFAS, including perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS), and other PFAS-related compounds. The controlled burning of #2 diesel fuel was performed at the MFTF in concrete pits and then extinguished using water, carbon dioxide, and foam. According to historical reports, the use of #2 diesel fuel for such training activities ended in 1986. Petroleum releases were identified at the MFTF and response actions were conducted under RTN 4-190. The most active area for firefighting training was located at the southwest corner of the MFTF where a "Flame Prop" and "Propane Tank Prop" were used. According to MFTF officials, foam training exercises at the MFTF ceased in 2009. Water training activities ceased in June 2019; live fire training structures and props have since been demolished and/or removed from the MFTF.

The approximately 6.2-acre MFTF is located in an industrial zoned area of Barnstable (Hyannis), Massachusetts. The land surrounding the MFTF is primarily undeveloped, wooded land with public water supply protection areas. Flintrock Pond occupies approximately 6 acres to the west of the MFTF. The land to the east and southeast of the MFTF is owned by the Town of Barnstable and is divided by two electric transmission/power line easements. Private industrial properties and related structures are located between approximately 500 and 1,000 feet south of the MFTF. The Barnstable Municipal Airport is also located to the south of the MFTF. Several public water supply wells and their related facilities are located to the east, southeast, and west of the MFTF which consists of several public water supply wells and their related facilities. Public water supply wells include the Mary Dunn Wells 1, 2, and 3 (MD-1, MD-2, and MD-3, respectively) which are owned by the Town of Barnstable through the Hyannis Water Supply Division (HWSD) of the Barnstable Department of Public Works (DPW) and are located within the disposal site boundary due to the detection of PFAS in groundwater at these wells; the Maher Wells (Maher Well 1, 2, and 3) which are owned by the Hyannis Water District and are located to the south of the Barnstable Municipal Airport; and two other public water supply wells, identified as Barnstable Fire District (BFD) wells BFD-2 and BFD-5, are located to the west of the Site. The BFD wells are operated by the Barnstable Fire District Water Department. There are no known private potable water wells located within the preliminary disposal site boundary.

The nearest residential properties are located approximately 0.25 miles north of the MFTF. There are no known Institutions (as that term is defined by the MCP) located with 500 feet of the Site. A review of the Massachusetts GIS Priority Resource Map identifies the Site as being located within a Zone II Public Water Supply Protection Area, a

Medium-Yield Sole Source Aquifer, and a United States Environmental Protection Agency (USEPA) Sole Source Aquifer. Therefore, the MCP GW-1 groundwater category applies to the Site. Groundwater has been measured at depths less than 15 feet below ground surface at the MFTF where an occupied building is present, therefore, the MCP GW-2 groundwater category also applies to portions of the Site. All groundwater within the Commonwealth is considered a potential source of discharge to surface waters and is categorized as GW-3), therefore the applicable MCP groundwater categories for the Site are GW-1, GW-2, and GW-3.

The nearest surface water bodies to the Site are Flintrock pond, located to the west and adjacent to the MFTF, an unnamed pond located to the northeast of the MFTF, and Mary Dunn Pond, located to the southeast of the Site; refer to **Figure 2.** Flintrock Pond is located within the preliminary disposal site boundary based on the detection of PFAS in sediment and surface water within the pond. The unnamed pond to the northeast of the MFTF appears to be identified as a Natural Heritage and Endangered Species (NHESP) potential vernal pool according to the Massachusetts GIS website (MassMapper). There are no mapped streams or wetlands located at the Site according to MassDEP mapping, however undocumented wetlands and other potential protection areas may be present within the disposal site.

The MFTF and adjacent area to the east have historically been the subject of four MassDEP RTNs: 4-190 (petroleum release as noted above), 4-11707 (petroleum release from UST), 4-20021 (perchlorate release), and 4-26179 (PFAS release). Regulatory closure in the form of a Class A-2 Response Action Outcome (now known as a Permanent Solution with No Conditions) was achieved for RTN 4-11707. MassDEP records indicate that RTN 4-20021 was linked to 4-190. In addition, RTN 4-0937 which is related to a release of chloroform from the upgradient property located at 100 Breeds Hill Road in Barnstable, Massachusetts historically impacted the Site. A Permanent Solution was achieved for RTN 4-0937 in 2003.

On November 30, 2013, water samples were collected from the Mary Dunn Public Water Supply Wells (MD-1, MD-2, and MD-3) and analyzed for PFAS under the USEPA Unregulated Contaminant Monitoring Rule (UCMR3) program. Elevated concentrations of PFOS and/or PFOA were detected in those samples. Given that PFAS were also detected at elevated concentrations in the soil and groundwater at the MFTF, and that the groundwater flow direction is from the MFTF to the Mary Dunn Wells, MassDEP determined that releases of PFAS from the use of AFFF at the MFTF is a source of PFAS detected in the Mary Dunn Wells. Releases of oil and/or hazardous materials (OHM) that impact public and water supplies could also pose an Imminent Hazard. Accordingly, MassDEP issued Barnstable County a Notice of Responsibility (NOR) on August 4, 2016, and assigned RTN 4-26179. The NOR outlined the following activities to be performed as part of the IRA:

- Excavating the soil "Hot Spot" contaminated with PFAS that is acting as an on-going source of groundwater contamination; and/or

- Expanding the existing groundwater recovery and treatment system to include additional recovery wells or an increase pumping rate to decrease the mass of PFAS in the groundwater at the MFTF.

On behalf of Barnstable County, the Cape Cod Commission submitted an IRA Plan to MassDEP on September 27, 2016, which included a plan to address the release of PFAS related to the use of fire-fighting foams at the MFTF. The IRA Plan stated that a PFOS Hot Spot was present in the southwestern portion of the MFTF, where an unpaved sump was previously located, and that a concentrated PFOS plume was migrating toward well PRW-4. A soil sample from 4-8 feet below ground surface (bgs) at boring B-3 in the Hot Spot area reportedly had a PFOS concentration of 4,900 micrograms per kilogram ("µg/kg" or parts per billion), compared to the current (2024) MCP Method 3 Ceiling Limit (M3CL)[1] of 4,000 µg/kg, and a soil sample collected just below the pavement from nearby boring HS-7 had 2,000 µg/kg PFOS. The reported PFOS concentrations in groundwater samples were 220,000 nanograms per liter ("ng/L" or parts per trillion) at PFW-2 in the

[1] Previously referred to as an Upper Concentration Limit (UCL).

Hot Spot Area in April 2015; 60,000 ng/L at PFW-1 in the southeast corner in October 2015; and 17,000 ng/L at PRW-4, located approximately 750 feet southeast of PFW-1, in September 2015.

The 2016 IRA Plan proposed the excavation of approximately 200 cubic yards of impacted soil from the Hot Spot, with a proposed 200-square foot (sf) area excavated to approximately 10 feet bgs and another 200-sf area excavated to approximately 5 feet bgs. The IRA Plan further proposed the amendment of the soil at the base of the excavation with a carbon material amendment commercially sold as Rembind, which consists of activated carbon supplemented with alum. The intent of the Rembind additive was for the amendment to "absorb remaining PFOS in the soil." It was noted that the product could result in the leaching of copper and aluminum to subsurface soils. In November 2016, MassDEP conditionally approved the IRA Plan, with a requirement that it be implemented in accordance with the Remedial Additive provisions of the MCP (310 CMR 40.0046) and that upgradient and downgradient groundwater samples be collected for analysis of the MCP-14 metals to assess for potential leaching impacts associated with the Rembind additive.

The IRA Plan was modified on June 28, 2018, in response to a Notice of Audit Findings – Immediate Response Action Field Inspection and Request for IRA Modification/Interim Deadline, issued by MassDEP dated June 1, 2018, to describe proposed interim modifications at the MFTF to improve stormwater and fire training water control and address flow towards the former Hot Spot area. A second IRA Plan Modification was submitted to MassDEP on December 20, 2019, in response to a directive from MassDEP to provide details for the expansion of the groundwater recovery and treatment system and capping measures to prevent infiltration of the precipitation through soils at the MFTF. The IRA Plan was modified a third time with the submittal of IRA Plan Modification No. 3, dated June 22, 2021, to formalize the inclusion of selected building demolition as part of the IRA. Details of IRA activities conducted under the IRA Plan and subsequent modifications are discussed below.

PRIOR IMMEDIATE RESPONSE ACTION ACTIVITIES

Since the submittal of the IRA Plan in September 2016, investigation and remedial response actions have been conducted to address the PFAS impacts at the Site. This section summarizes the status of prior IRA activities, including those that are ongoing. Additional details regarding these IRA activities can be found in previous IRA status reports which have been submitted to MassDEP by others. GZA's review of MassDEP files[2] indicates that the following key remedial response actions have been conducted at the MFTF as interim and IRA response actions:

- In July 2015, existing recovery well PRW-4, which had been previously installed as a recovery well associated with the former perchlorate release, was reactivated in an attempt to contain PFAS-impacted groundwater. The captured groundwater is then treated for PFAS via granular activated carbon treatment system (designated as GWTS #1). The capture zone of PRW-4 is estimated to be approximately 200 feet at a pumping rate of 40 gallons per minute (gpm); the initial pumping rate was approximately 38 gpm. The extracted groundwater is pumped via two 2-inch-diameter force mains to the GWTS-1 system. The treated groundwater is discharged to the subsurface via recharge/infiltration chambers located in the north-central area of the MFTF. Spent GAC is transported off-Site for thermal regeneration or destruction.

- In January 2017, the Hot Spot area was excavated to depths between 5 and 10 feet bgs, and Rembind was placed in the bottom of the excavation prior to backfilling, with the goal of reducing subsequent leaching of PFAS from the soil to groundwater. It was noted in more recent IRA status reports that post-excavation settling in the Hot Spot area left that area prone to infiltration of runoff from the southern portion of the MFTF. Following the submittal of IRA Plan Modification No. 1 in June 2018, Phase 1 Stormwater Management Improvements were

[2] Some of the key 2017-era reports on the Energy and Environmental Affairs (EEA) Data Portal are labeled "portfolio.pdf" and were not accessible to GZA.

completed between December 2018 and February 2019 to re-direct stormwater and fire training runoff water away from the Hot Spot area and Flintrock Pond, including placement of fill, polyethylene sheeting, and peastone over the former Hot Spot.

- In accordance with IRA Plan Modification No. 2, which was submitted in December 2019, a second groundwater treatment system GWTS #2 was constructed and added to provide additional temporary groundwater treatment capacity. This system is served by one of the force mains from GWTS #1, and it consists of two 1,300-pound GAC vessels housed in a heated shipping container. A new 4-inch PVC gravity discharge line was installed below grade and discharged to one of the existing recharge basins to the north.

- Following the submittal of IRA Plan Modification No. 3 in June 2021, the County completed a property-wide capping and select building demolition at the former MFTF between August and October 2021. The project included the demolition and removal of the former burn buildings and other fire training props; off-site disposal of approximately 650 tons of PFAS- contaminated demolition debris; construction of an asphalt cap over approximately 59,000 square feet of the MFTF; and installation of new stormwater drain structures, catch basins, a dual-chamber oil-water separator (Stormceptor) and stormwater discharge structure on the west side of the MFTF.

Monthly IRA Status Reports were submitted to MassDEP until January 2022, when the reporting frequency was decreased to once every six months. The most recent IRA Status Report for the July 2023 through December 2023 reporting period (No. 66, issued in January 2024) indicated that GWTS #1 and #2 were operational for 179 days between July and December 2023, and treated approximately 2.4 million gallons of groundwater during that period. The estimated influent flow rate ranged from 2.8 gpm in July and August 2023 to 17.3 gpm in September 2023. The unusually low treatment volumes and flow rates in July and August were attributed to reduced performance due to naturally occurring iron sludge build-up in recovery well PRW-4 and the force mains, which were cleaned in late August 2023. The cleaning resulted in higher flow rates for two months, but a decline was noted in November and December 2023.

IRA Status Report No. 66 reported that dissolved PFAS6 concentrations at PRW-4 (i.e., system influent concentrations) had remained relatively consistent since summer 2021, in the range of 400 to 800 ng/L. Four of the six PFAS6 compounds in the effluent sample exceeded 1.8 ng/L in September 2023, but were below reporting limits in July, August, October, November, and December 2023. The dissolved PFOS concentration at PFW-1, immediately downgradient of the Hot Spot area, was reported to be 20,000 ng/L in November 2023, similar to the concentration seen through February 2020. This was higher than the concentrations observed between May 2020 and November 2022, when PFOS concentrations at this location were consistently reported to be less than 7,600 ng/L. The report attributed the increasing concentrations in 2023 to a decrease in effectiveness of the Rembind that was installed in 2017 at the Hot Spot Area.

Note that, in addition to the remedial activities described above, extensive assessment activities have been conducted at the Site. These activities have been, and will continue to be, described in Interim Phase II Comprehensive Site Assessment (CSA) Status Reports, the most recent of which was submitted to MassDEP in February 2024.

IMMEDIATE RESPONSE ACTION PLAN MODIFICATION

This IRA Plan Modification is being submitted to describe proposed activities in support of the evaluation of the efficacy of an in-situ CAC PRB as a response action to limit the migration of PFAS related compounds from historic use of fire-fighting foams at the MFTF. The CAC pilot test will be performed in the southeastern portion of the MFTF, hydraulically downgradient of the former hot spot area and proximate to monitoring well PFW-1, which typically exhibits the highest PFAS concentrations at the site. The approximate location and alignment of the pilot test area is shown on **Figure 2**.

Should the pilot test confirm the effectiveness and suitability of containing the PFAS plume, the pilot test results may be used to design a full-scale PRB along portions or the entirety of the downgradient edge of the MFTF property. Such an installation would be conducted under a future IRA Modification.

PERMEABLE REACTIVE BARRIER PILOT TEST

The primary source of PFAS discharge from MFTF appears to be from the southwestern portion of the MFTF near the former Hot Spot area as evidenced by the elevated concentrations of PFAS detected in existing monitoring well PFW-1. Groundwater in this area of the Site appears to flow generally toward and the south/southeast. The PRB pilot test will target the area downgradient of the former Hot Spot area adjacent to PFW-1.

For this project, GZA will retain and coordinate with Regenesis Remediation Services (RRS) regarding the design and execution of the PRB pilot test. RRS is a commercial designer and vendor of remedial products related to the containment and/or destruction of certain environmental contaminants. RRS's PlumeStop® CAC formula will be utilized for the MFTF site. The pilot test will involve the injection of PlumeStop® CAC in a grid-like fashion over an approximately 30-foot by 10-foot alignment downgradient of the former Hot Spot in the southeastern portion of the MFTF; refer to **Figure 2**. The efficacy of the PlumeStop® PRB will be evaluated based on the pre- and post-injection groundwater samples collected from a pre-existing well (PFW-1) and new wells installed within the treatment area, hydraulically upgradient, and hydraulically downgradient of the treatment area as shown on **Figure 2**.

The new wells are constructed as couplets and triplets with shallow, intermediate, and/or deep well screened intervals. The depths and rationale for these depths are presented below:

Target Monitoring Zone	Approximate Depth (BGS)	Rationale
Shallow	10-20 feet (outwash sand)	• Intercept the local water table • Assess shallow hydraulic gradient • Monitoring shallow groundwater quality • Assess hydraulic properties of the aquifer materials
Intermediate	38-48 feet (outwash sand)	• Monitor intermediate groundwater quality • Assess vertical hydraulic gradient • Assess hydraulic properties of the aquifer materials
Deep	58-68 feet (base of the outwash sand)	• Monitor intermediate groundwater quality • Assess vertical hydraulic gradient • Confirm depth to the underlying silt/clay confining layer • Assess hydraulic properties of the aquifer materials

At each drilling location, the deep member of the well couplet or triplet was drilled first with continuous or near-continuous soil sampling at select intervals for hydrogeological lithologic descriptions. The intermedial and shallow members were advanced with very limited or no sampling based on the logged information from the deep soil boring. Low permeable soils consisting of silt and clay were encountered in the soil boings at depths ranging between approximately 67 and 79 feet bgs.

GZA anticipated that running sands[3] would likely be encountered while drilling the borings for these wells, therefore drive and wash casing drilling methods were used to advance the deep and intermediate members of each well couplet or triplet location. This drilling method affords more options for controlling running sands while collecting soil samples for lithologic descriptions; however, it requires the use of (and potential loss) of significant quantities of drilling water. Hollow stem auger drilling methods were used to advance the soil borings for the shallow members of the well couplets or triplets in an attempt to reduce the use and/or loss of drilling water to the formation.

Barnstable municipal water available from a hydrant located at the MFTF was utilized for the drilling operations.[4] Following well installation, GZA developed the new wells using conventional pumping and surging techniques. Approximately three to five well volumes was purged from the wells during well development. Following well development activities, GZA collected baseline (i.e., prior to PRB installation) groundwater samples from each new well couplet/triplet on August 2, 2024. The groundwater samples were submitted to Alpha Analytical (Alpha - a division of Pace Labs) in Mansfield, Massachusetts for PFAS analysis via EPA Method 1633, total organic carbon (TOC) via method SM5310C, and volatile petroleum hydrocarbons (VPH) and extractable petroleum hydrocarbons (EPH) via MassDEP methodologies. In addition, soil samples were collected from select depths and locations during borehole drilling for the following analyses: EPH, VPH, fraction of organic carbon (FOC) by Walkley Black method, redox, pH, cation exchange capacity, bulk density, and specific area by Brunauer-Emmett-Teller method.

GZA will retain RRS to inject the PlumeStop® CAC product using Direct Push Technology from the groundwater surface (approximately 13 feet bgs) to the top of the observed silty clay layer (approximately 67 feet bgs). As with the drilling, only Barnstable municipal water obtained from the MFTF hydrant will be utilized for the injections. It is anticipated that the PlumeStop® product will be injected at 12 injection points spaced approximately 5 feet apart; a total of approximately 19,200 lbs. of PlumeStop® (20,916 gallons of solution) will be injected. During the injections, placement verification testing, via soil cores and/or water samples, will be conducted to assess the dispersion of the PlumeStop®. The initial target injection concentrations (approximately 0.9 lbs./gallon), volume per vertical foot (approximately 39 gallons), injection intervals (approximately 44.5 feet), and/or spacing between injection points (approximately 5 feet) may be adjusted based on the results of the placement verification testing. It is anticipated that the injections will take approximately seven working days to complete.

Given the target depth of the injections, GZA does not anticipate that the pilot test will erode or otherwise impair the function of surficial or subsurface soils. Past experience with similar injection programs indicates that surficial breakthrough (daylighting) of PlumeStop® (if any) will be limited to the immediate area of the injection point. GZA notes that the PRB pilot test will be conducted within an area of the MFTF that is paved and PlumeStop® that may accumulate on the paved surface will be collected and managed during the installation process. Further, no underground utilities, buildings, or subsurface structures are located in the immediate vicinity of the pilot test area. In addition, given the hydraulic conductivity of the surficial sands underlying the MFTF, groundwater mounding within two feet of the ground surface is not anticipated. Should daylighting or mounding occur, injection rates will be reduced to alleviate the condition.

Note, Flintrock Pond is located approximately 200 feet west (upgradient) of the anticipated PlumeStop® injection area. Based on past experiences at other similar Sites, RRS does not anticipate that the PlumeStop® will migrate to Flintrock Pond given the distance and relatively low hydraulic gradient; however, GZA personnel will monitor Flintrock Pond for

[3] Running sands occur when water saturated loosely-packed sands become fluidized and are carried into a borehole or other type of void as a result of lateral and/or upward flow water into the drilling equipment.

[4] While low concentrations of certain PFAS compounds have been detected in the municipal water supply, the concentrations are well below those observed within the overburden in this area of the Site. Given the noted concentrations and the uncertain quantity of water required for the drilling and the subsequent injections in this area of the Site, GZA considers the use of PFAS-free water to be impracticable.

potential breakout of the PlumeStop® throughout the implementation of the pilot test. If breakout is observed in Flintrock Pond, the PlumeStop® injections will be immediately discontinued while an alternative plan is developed.

PlumeStop® contains a polymerized coating which allows the particles to remain suspended in solution. According to information provided by Regenesis, the coating consists of a water-soluble, food-grade polymer that is classified as not persistent, bio-accumulative, or toxic and degrades completely when it ends up in the environment. GZA understands that MassDEP has reviewed the propriety ingredients of PlumeStop® and the polymerized coating. On August 26, 2024, GZA received approval from the MassDEP for use of PlumeStop® as discussed herein; refer to **Appendix E**. GZA will visually monitor groundwater wells hydraulically downgradient of the PRB pilot test area to assess whether or not migration of the CAC is occurring. The expected radius of influence of the PRB injections is approximately 3.5 feet, therefore, migration of the CAC to the public drinking water supply wells (Mary Dunn wells) located south/southeast of the Site is not anticipated. Should migration of PlumeStop® be observed in downgradient monitoring wells, GZA will work with RSS to mitigate migration. If necessary, a calcium chloride salt can be applied to prevent further migration. The calcium chloride salt acts as a destabilizing agent which will cause the Plume Stop® particles to agglomerate via cation bridging, increasing the particle size, and preventing further transport.

Following the completion of the PlumeStop® PRB pilot test injections, GZA will conduct post-injection groundwater monitoring at the wells within the pilot test area (PFW-1 and the proposed new well couplets and triplets) to assess the effectiveness of the PlumeStop® PRB. GZA personnel will collect groundwater samples from these wells on a monthly basis for the first three months following the PlumeStop® PRB installation, and then on a quarterly basis thereafter for approximately one year. Based on the estimated seepage velocity at the Site (approximately 1.3 feet per day)[5], we anticipate that the pore water volume exchange within the treatment area will be sufficient to monitor the effectiveness of the PRB during this time. The groundwater samples will be submitted to Alpha for analysis for PFAS via EPA Method 1633, TOC via method SM5310C, and VPH and EPH via MassDEP methodologies. Groundwater samples will also be visually assessed for the presence of carbon to monitor for migration of PlumeStop®.

SCHEDULE

It is anticipated that the PlumeStop® CAC injections will be initiated in September 2024 upon approval of this IRA Plan Modification. The PlumeStop® injections are anticipated to take approximately seven working days to complete. Baseline groundwater samples were collected from the PRB monitoring wells on August 2, 2024. Post-remedial monitoring of the PRB monitoring wells, will take place on a monthly basis for the first three months following the PlumeStop® PRB installation, and then on a quarterly basis thereafter for up to one year.

The activities described in this IRA Plan Modification will be summarized in a future IRA Status Report.

MANAGEMENT OF REMEDIATION WASTES

The borehole cuttings generated during the drilling of the proposed PRB monitoring wells were containerized in drums and will be characterized for proper off-site disposal. The drilling water and other water generated during this work was processed through the on-site groundwater treatment system.

[5] The hydraulic conductivity of the aquifer material is estimated from USGS groundwater modeling, monitoring well slug-tests, and pump tests of the Mary Dunn wells.

Please contact Mr. David Leone at (781) 278-5766 if you have questions concerning this IRA Plan Modification.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Daniel R. Scanlon
Senior Project Manager

John R. Paquin
Principal in Charge
Project Coordinator

David E. Leone, LSP of Record
Principal

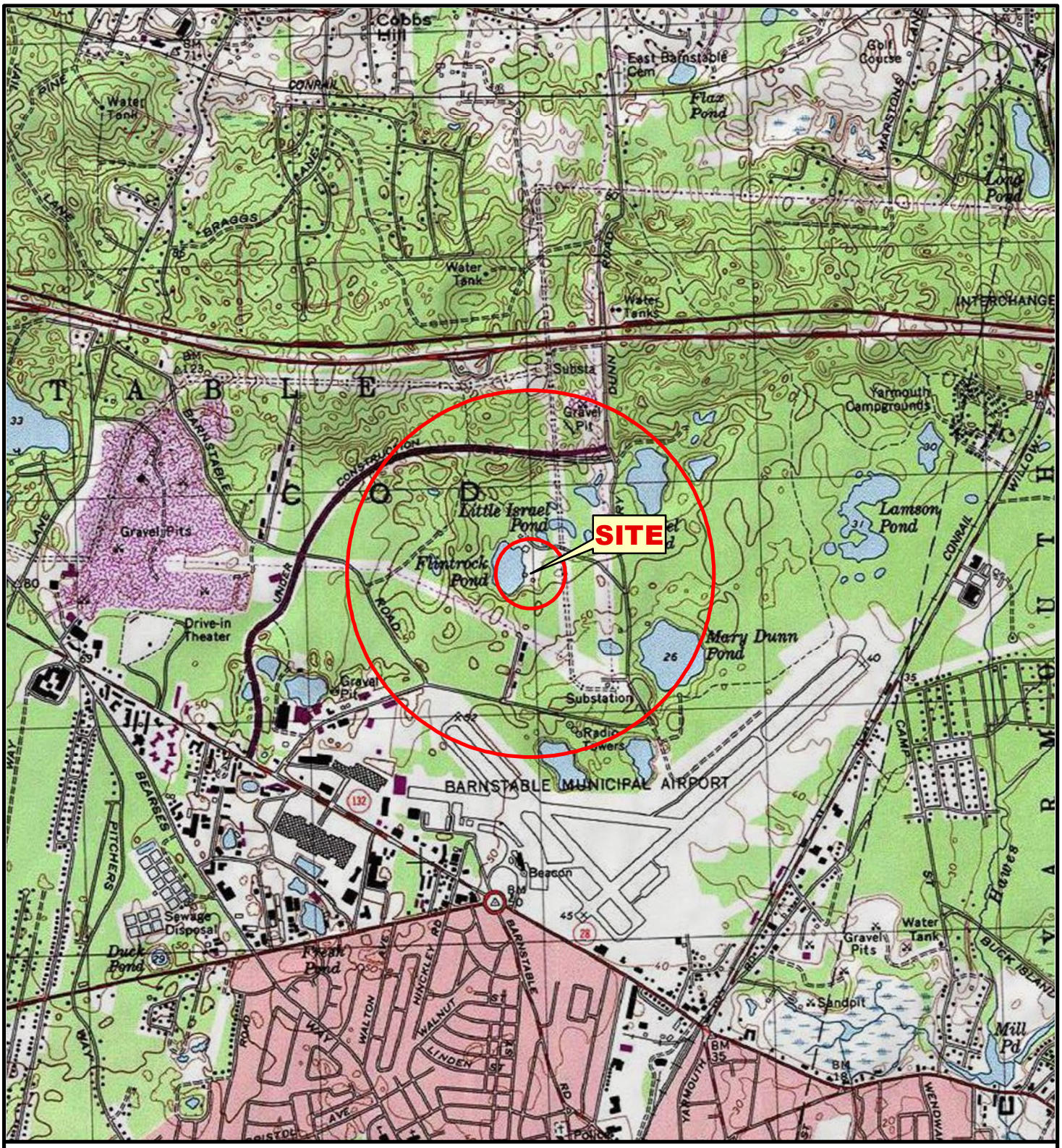
Matthew Smith, LSP
Principal

cc: Paul Ruszala, County Commissioners, Assets and Infrastructure Manager

Attachments:

Figure 1 – Site Locus
Figure 2 – Site Plan
Appendix A – USEPA Community Guide to Permeable Reactive Barriers
Appendix B – Limitations
Appendix C – IRA Transmittal Form (BWSC105)
Appendix D – Response to Public Comments
Appendix E – MassDEP Approval

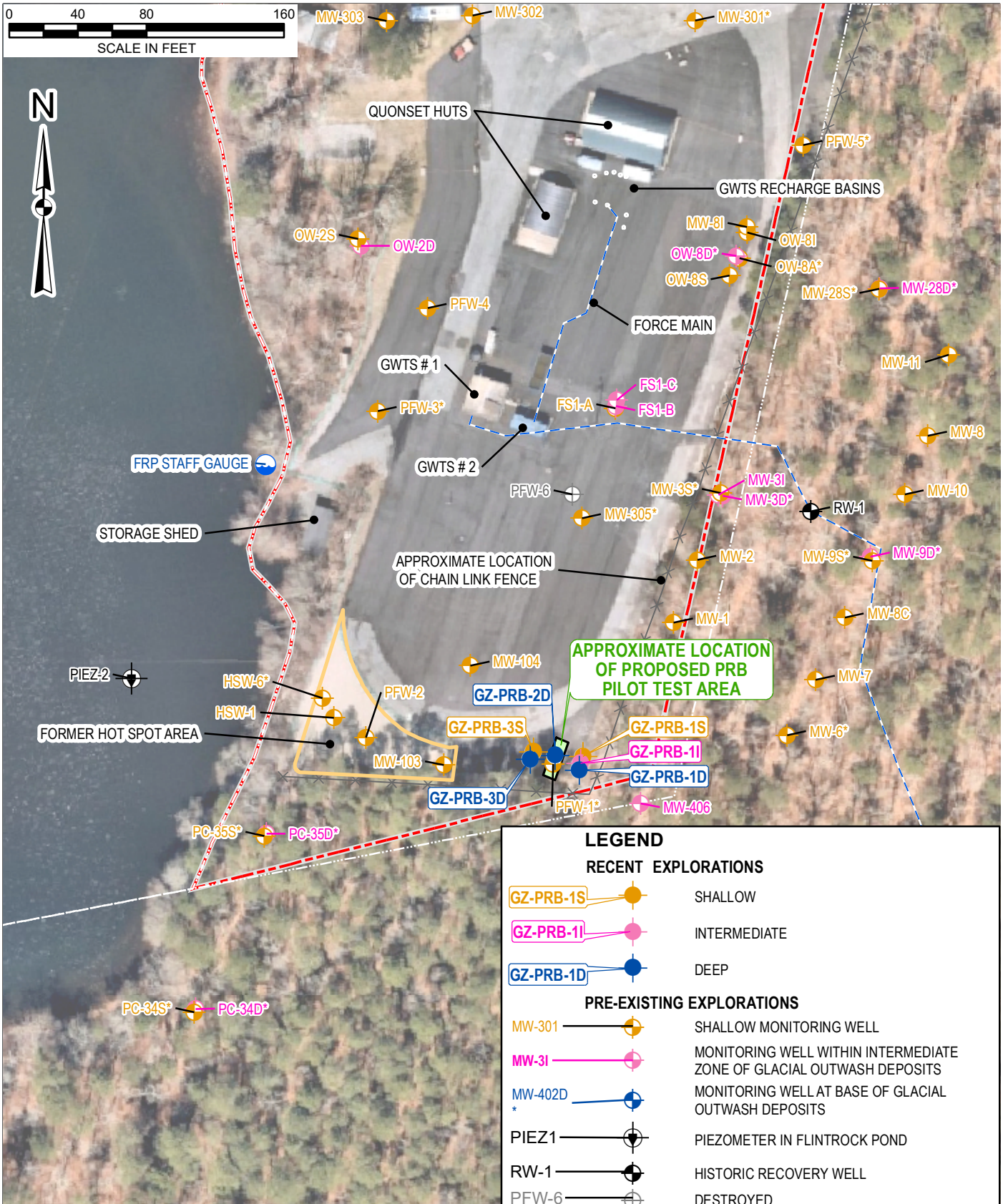
Figures



SOURCE : USGS TOPOGRAPHIC QUADRANGLES SCANNED BY THE NATIONAL GEOGRAPHIC SOCIETY & I-CUBED, COPYRIGHT 2011

Data Supplied by : esri

GZA	PROJ. MGR.: DRS DESIGNED BY: DRS REVIEWED BY: DEL OPERATOR: DSR DATE: 06-20-2024	SITE LOCUS SHOWING 500 FOOT & 1/2 MILE OFFSETS	JOB NO. 01.0177641.10
		IRA PLAN MODIFICATION 155 S FLINT ROCK ROAD HYANNIS, MASSACHUSETTS	FIGURE NO. 1



LEGEND

RECENT EXPLORATIONS

- GZ-PRB-1S — SHALLOW
- GZ-PRB-1I — INTERMEDIATE
- GZ-PRB-1D — DEEP

PRE-EXISTING EXPLORATIONS

- MW-301 — SHALLOW MONITORING WELL
- MW-3I — MONITORING WELL WITHIN INTERMEDIATE ZONE OF GLACIAL OUTWASH DEPOSITS
- MW-402D* — MONITORING WELL AT BASE OF GLACIAL OUTWASH DEPOSITS
- PIEZ1 — PIEZOMETER IN FLINTROCK POND
- RW-1 — HISTORIC RECOVERY WELL
- PFW-6 — DESTROYED
- FRP STAFF GAUGE — STAFF GAUGE
- SITE BOUNDARY

FORMER MUNICIPAL FIRE TRAINING FACILITY
155 SOUTH FLINT ROCK ROAD
BARNSTABLE, MASSACHUSETTS

IRA PLAN MODIFICATION
SITE PLAN

PREPARED BY: GZA GeoEnvironmental, Inc. www.gza.com

PREPARED FOR: BARNSTABLE COUNTY

PROJ MGR: JEM	REVIEWED BY: MMS	CHECKED BY: DEL	FIGURE 2
DESIGNED BY: DRS	DRAWN BY: GWB	SCALE: 1 " = 80 FEET	
DATE: 08/14/2024	PROJECT NO: 01.0177641.10	REVISION NO:	

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Appendix A - USEPA Community Guide to Permeable Reactive Barriers

Community Guide to Permeable Reactive Barriers

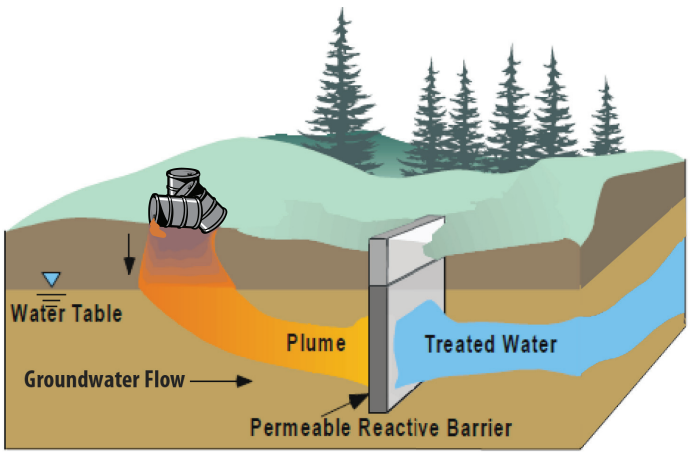
What Is A Permeable Reactive Barrier?

A permeable reactive barrier, or "PRB," is a wall created below ground to clean up contaminated groundwater. The wall is "permeable," which means that groundwater can flow through it. Water must flow through the PRB to be treated. The "reactive" materials that make up the wall either trap harmful contaminants or make them less harmful. The treated groundwater flows out the other side of the wall.

How Does It Work?

PRBs are usually built by digging a long, narrow trench in the path of contaminated groundwater flow. The trench is filled with a reactive material, such as iron, limestone, carbon or mulch, to clean up contaminants from groundwater. Due to limitations of excavation equipment, PRBs typically can be no deeper than 50 feet. However, a deeper but usually shorter PRB can be built by drilling a row of large-diameter holes or by using fracturing. (See *Community Guide to Fracturing for Site Cleanup*.) Fracturing methods connect the reactive material to deeper contaminated groundwater.

The reactive material selected for the PRB will depend on the types of contaminants present in the groundwater. The material may be mixed with sand to make the wall more permeable so that it is easier for groundwater to flow through it, rather than around it. Side walls filled with a less permeable material such as clay may be constructed at an angle to the PRB to help funnel the flow of contaminated groundwater toward the reactive materials. The filled trench is covered with soil.



PRB treats a plume of groundwater contaminants.

Depending on the reactive material, contaminants are removed through different processes:

- Contaminants ***sorb*** (stick) to the surface of the reactive material. For example, carbon particles have a surface onto which contaminants, such as petroleum products, sorb as groundwater passes through.
- Metals dissolved in groundwater ***precipitate***, which means they are removed from groundwater by forming solid particles that get trapped in the wall. For example, limestone and shell fragments can cause dissolved lead and copper to precipitate in a PRB.
- Contaminants ***react*** with the reactive material to form less harmful ones. For example, reactions between metallic iron particles in a PRB and certain industrial cleaning solvents can convert the solvents to less toxic or even harmless chemicals.
- Contaminants are ***biodegraded*** by microbes in the PRB. Microbes are very small organisms that live in soil and groundwater and eat certain contaminants. When microbes digest the contaminants, they change them into water and gases, such as carbon dioxide. (See *Community Guide to Bioremediation*.) Organic mulch frequently is used as reactive media in this type of PRB. Mulch barriers consist of plant-based materials, such as compost or wood chips, and naturally contain many different microbes. Groundwater flow through the PRB also releases organic carbon from the mulch wall, creating another reactive zone for contaminants just beyond the wall. Microbes also can make some contaminants (like arsenic and uranium) less soluble in groundwater by changing their chemical form.

Over time, PRBs can fill up with sorbed or precipitated contaminants, making them less effective at cleaning groundwater. When this occurs, the contaminated reactive material may be excavated for disposal and replaced with fresh material.

How Long Will It Take?

PRBs may take many years to clean up contaminated groundwater. The cleanup time will depend on factors that vary from site to site. For example, PRBs will take longer where:

- The source of dissolved contaminants (for instance, a leaking drum of solvent) has not been removed.
- The contaminants remain in place because they are not easily dissolved by groundwater.
- Groundwater flow is slow.
- The reactive material must be replaced frequently.

Are PRBs Safe?

The reactive materials placed in PRBs are not harmful to groundwater or people. Contaminated groundwater is cleaned up underground, so treatment does not expose workers or others onsite to contamination. Because some contaminated soil may be encountered when digging the trench, workers wear protective clothing. Workers also cover loose contaminated soil to keep dust and vapors out of the air before disposing of it. Groundwater is tested regularly to make sure the PRB is working.

How Might It Affect Me?

During construction of the PRB, you may see increased truck traffic when materials are hauled to the site, or you might hear earth-moving equipment. However, when complete, PRBs require no noisy equipment. Cleanup workers will occasionally visit the site to collect groundwater and soil samples to ensure that the PRB is working. When the reactive materials need to be replaced, the old materials will have to be excavated and hauled to a landfill.

Why Use PRBs?

PRBs are a relatively inexpensive way to clean up groundwater. No energy is needed because PRBs rely on the natural flow of groundwater. The use of some materials, such as limestone, shell fragments and mulch, can be very inexpensive, if locally available. No equipment needs to be aboveground, so the property may continue its normal use, once the PRB is installed.

Construction of a PRB in Sunnyvale, CA

PRBs have been selected for use at dozens of Superfund sites and other cleanup sites across the country.

Example

Groundwater at the Parker Sanitary Landfill Superfund site in Vermont was contaminated with solvents as a result of past disposal of industrial wastes. In 2000, a cap was placed on the landfill to keep rainfall from seeping into the wastes and causing more contaminants to enter groundwater. In 2005, a PRB was installed to treat groundwater and prevent the flow of contaminants from the site.

The 235-foot wide PRB is filled with iron particles and sand and extends 30 feet to 62 feet below the ground surface. Contaminated groundwater from a part of the landfill that received industrial waste flows through the PRB. Groundwater sampling results indicate that cleanup goals are being met by the PRB.

For More Information

- About this and other technologies in the Community Guide Series, visit: https://clu-in.org/cguides or https://clu-in.org/remediation/
- About use of cleanup technologies at a Superfund site in your community, contact the site's community involvement coordinator or remedial project manager. Select the site name from the list or map at http://www.epa.gov/superfund/sites to view their contact information.

Appendix B – Limitations

USE OF REPORT

1. GZA GeoEnvironmental, Inc. (GZA) prepared this Report on behalf of, and for the exclusive use of our Client for the stated purpose(s) and location(s) identified in the Proposal for Services and/or Report. Use of this Report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not expressly identified in the agreement, for any use, without our prior written permission, shall be at the party's sole risk, and without any liability to GZA.

STANDARD OF CARE

2. GZA's findings and conclusions are based on work conducted as part of the Scope of Services set forth in the Proposal for Services and/or Report and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. Conditions other than described in this report may be found at the subject location(s).

3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or similar property. No warranty, express or implied, is made. Specifically, GZA does not and cannot represent that the Site contains no hazardous material, oil, or other latent condition beyond that observed by GZA during its study. Additionally, GZA makes no warranty that any response action or recommended action will achieve all of its objectives or that the findings of this study will be upheld by a local, state, or federal agency.

4. In conducting our work, GZA relied upon certain information made available by public agencies. Client and/or others. GZA did not attempt to independently verify the accuracy or completeness of that information. Inconsistencies in this information which we have noted, if any, are discussed in the Report.

SUBSURFACE CONDITIONS

5. The generalized soil profile(s) provided in our Report are based on widely-spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, were developed utilizing interpolation/extrapolation methods, and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs. The nature and extend of variations between these explorations may not become evident until further exploration or construction. If variations or other latent conditions then become evident, it will be necessary to reevaluate the conclusions and recommendations of this Report.

6. Water level readings have been made, as described in this Report, in the specified monitoring wells at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this Report. Fluctuations in the level of the groundwater, however, occur due to temporal or spatial variations in areal recharge rates and heterogeneities, the presence of subsurface utilities, and/or natural or artificially induced perturbations. The observed water table and hydraulic heads may be other than indicated in the Report.

COMPLIANCE WITH CODES AND REGULATIONS

7. We used reasonable care in identifying and interpreting applicable codes and regulations necessary to execute our scope of work. These codes and regulations are subject to various, and possibly contradictory, interpretations. Interpretations and compliance with codes and regulations by other parties is beyond our control.

SCREENING AND ANALYTICAL TESTING

8. GZA collected environmental samples at the locations identified in the Report. These samples were analyzed for the specific parameters identified in the Report. Additional constituents, for which analyses were not conducted, may be present in soil, groundwater, surface water, sediment, and/or air. Future Site activities and uses may result in a requirement for additional testing.

9. Our interpretation of field screening and laboratory data is presented in the Report. Unless noted otherwise, we relied upon the laboratory's QA/QC program to validate these data.

10. Variations in the types and concentrations of contaminants observed at a given location or time may occur due to release mechanisms, disposal practices, changes in flow paths, and/or the influence of various physical, chemical, biological, or radiological processes. Subsequently observed concentrations may be other than indicated in the Report.

INTERPRETATION OF DATA

11. Our opinions are based on available information and data as described in the Report, and on our professional judgment. Additional observations made over time, and/or space, may not support he opinions provided in the Report.

ADDITIONAL INFORMATION

12. In the event that the Client or others authorized to use this report obtain additional information on environmental or hazardous waste issues at the Site not contained in this Report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this evaluation, may modify the conclusions stated in this Report.

ADDITIONAL SERVICES

13. GZA recommends that we be retained to provide services during any future investigations, design, implementation, activities, construction, and/or property development/redevelopment of the Site. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.

CONCEPTUAL SITE MODEL

14. Our opinions were developed, in part, based upon a comparison of site information and data available at the time of development to conditions anticipated within our Conceptual Site Model (CSM). The CSM is based on available

information, and professional judgment. There are rarely sufficient data to develop a definitive CSM. Therefore, observations over time, and/or space, may vary from those depicted in the CSM provided in this Report. The inherent variability and complexity of subsurface conditions mean that the CSM should be considered a dynamic tool rather than a static representation. Therefore, the CSM should be evaluated and refined (as appropriate) whenever significant new information and/or data is obtained.

Appendix C – IRA Transmittal Form (BWSC105)

Massachusetts Department of Environmental Protection

eDEP Transaction Copy

Here is the file you requested for your records.

To retain a copy of this file you must save and/or print.

Username:	**DELEONE**
Transaction ID:	**1787576**
Document:	**BWSC105 Immediate Response Action Transmittal Form**
Size of File:	**199.94K**
Status of Transaction:	**Submitted**
Date and Time Created:	**9/5/2024:11:18:39 AM**

Note: This file only includes forms that were part of your transaction as of the date and time indicated above. If you need a more current copy of your transaction, return to eDEP and select to “Download a Copy” from the Current Submittals page.

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

Immediate Response Action (IRA) Transmittal Form
Pursuant to 310 CMR 40.0424 - 40.0427 (Subpart D)

BWSC 105

Release Tracking Number
4 - 26179

A. SITE LOCATION:

1. Release Name/Location Aid: BARNSTABLE COUNTY FIRE TRAINING ACADEMY

2. Street Address: 155 SOUTH FLINT ROCK ROAD

3. City/Town: BARNSTABLE 4. Zip Code: 026300000

☐ 5. Check here if this location is Adequately Regulated, pursuant to 310 CMR 40.0110-0114.

☐ a. CERCLA ☐ b. HSWA Corrective Action ☐ c. Solid Waste Management

☐ d. RCRA State Program (21C Facilities)

B. THIS FORM IS BEING USED TO: (check all that apply)

1. List Submittal Date of Initial IRA Written Plan (if previously submitted): 9/26/2016

☐ 2. Submit an **Initial IRA Plan**.

☑ 3. Submit a **Modified IRA Plan** of a previously submitted written IRA Plan.

☐ 4. Submit an **Imminent Hazard Evaluation**. (check one)

☐ a. An Imminent Hazard exists in connection with this Release or Threat of Release.

☐ b. An Imminent Hazard does not exist in connection with this Release or Threat of Release.

☐ c. It is unknown whether an Imminent Hazard exists in connection with this Release or Threat of Release, and further assessment activities will be undertaken.

☐ d. It is unknown whether an Imminent Hazard exists in connection with this Release or Threat of Release. However, response actions will address those conditions that could pose an Imminent Hazard.

☐ 5. Submit a request to **Terminate an Active Remedial System or Response Action(s) Taken to Address an Imminent Hazard**.

☐ 6. Submit an **IRA Status Report**

☐ 7. Submit a **Remedial Monitoring Report**. (This report can only be submitted through eDEP.)

a. Type of Report: (check one) ☐ i. Initial Report ☐ ii. Interim Report ☐ iii. Final Report

b. Frequency of Submittal: (check all that apply)

☐ i. A Remedial Monitoring Report(s) submitted monthly to address an Imminent Hazard.

☐ ii. A Remedial Monitoring Report(s) submitted monthly to address a Condition of Substantial Release Migration.

☐ iii. A Remedial Monitoring Report(s) submitted every six months, concurrent with an IRA Status Report.

☐ iv. A Remedial Monitoring Report(s) submitted annually, concurrent with an IRA Status Report.

c. Number of Remedial Systems, Active Exposure Pathway Mitigation Measures and/or Monitoring Programs: _____

A separate BWSC105A, IRA Remedial Monitoring Report, must be filled out for each Remedial System and/or Monitoring Program addressed by this transmittal form.

☐ 8. Submit an **IRA Completion Statement**.

☐ a. Check here if future response actions addressing this Release or Threat of Release notification condition will be conducted as part of the Response Actions planned or ongoing at a Site that has already been Tier Classified under a different Release Tracking Number (RTN)

b. Provide Release Tracking Number of Tier Classified Site (Primary RTN): _____ _____

These additional response actions must occur according to the deadlines applicable to the Primary RTN. Use the Primary RTN when making all future submittals for the site unless specifically relating to this Immediate Response Action.

☐ 9. Submit a **Revised IRA Completion Statement**.

☐ 10. Submit a **Plan for the Application of Remedial Additives** near a sensitive receptor, pursuant to 310 CMR 40.0046(3).

(All sections of this transmittal form must be filled out unless otherwise noted above)

C. RELEASE OR THREAT OF RELEASE (TOR) CONDITIONS THAT WARRANT IRA:

1. Media Impacted and Receptors Affected: (check all that apply)

☐ a. Paved Surface ☐ b. Basement ☐ c. School
☑ d. Public Water Supply ☑ e. Surface Water ☑ f. Zone 2 ☐ g. Private Well ☐ h. Residence ☑ i. Soil
☑ j. Groundwater ☑ k. Sediments ☑ l. Wetland ☐ m. Storm Drain ☐ n. Indoor Air ☐ o. Air
☐ p. Soil Gas ☐ q. Sub-Slab Soil Gas ☐ r. Critical Exposure Pathway ☐ s. NAPL ☐ t. Unknown
☐ r. Others Specify: _____

2. Sources of the Release or TOR: (check all that apply)

☐ a. Transformer ☐ b. Fuel Tank ☐ c. Pipe
☐ d. OHM Delivery ☐ e. AST ☐ f. Drums ☐ g. Tanker Truck ☐ h. Hose ☐ i. Line
☐ j. UST Describe: _____ ☐ k. Vehicle ☐ l. Boat/Vessel
☐ m. Unknown ☑ n. Other: FIRE FIGHTING FOAMS

3. Type of Release or TOR: (check all that apply)

☐ a. Dumping ☐ b. Fire ☐ c. AST Removal ☐ d. Overfill
☐ e. Rupture ☐ f. Vehicle Accident ☐ g. Leak ☐ h. Spill ☐ i. Test failure ☐ j. TOR Only
☐ k. UST Removal Describe: _____
☐ l. Unknown ☑ m. Other: HISTORIC FIRE TRAINING

4. Identify Oils and Hazardous Materials Released: (check all that apply)

☐ a. Oils ☐ b. Chlorinated Solvents
☐ c. Heavy Metals ☑ d. Others Specify: PFAS

D. DESCRIPTION OF RESPONSE ACTIONS: (check all that apply, for volumes list cumulative amounts)

☐ 1. Assessment and/or Monitoring Only
☑ 2. Temporary Covers or Caps
☐ 3. Deployment of Absorbent or Containment Materials
☐ 4. Temporary Water Supplies
☐ 5. Structure Venting System/HVAC Modification System
☐ 6. Temporary Evacuation or Relocation of Residents
☐ 7. Product or NAPL Recovery
☐ 8. Fencing and Sign Posting
☑ 9. Groundwater Treatment Systems
☐ 10. Soil Vapor Extraction
☑ 11. Remedial Additives
☐ 12. Air Sparging
☐ 13. Active Exposure Pathway Mitigation System
☐ 14. Passive Exposure Pathway Mitigation System

D. DESCRIPTION OF RESPONSE ACTIONS: (cont.)

☐ 15. Excavation of Contaminated Soils.

☐ a. Re-use, Recycling or Treatment ☐ i. On Site Estimated volume in cubic yards _____

☐ ii. Off Site Estimated volume in cubic yards _____

iia. Receiving Facility: _____ Town: _____ State: _____

iib. Receiving Facility: _____ Town: _____ State: _____

iii. Describe: _____

☐ b. Store ☐ i. On Site Estimated volume in cubic yards _____

☐ ii. Off Site Estimated volume in cubic yards _____

iia. Receiving Facility: _____ Town: _____ State: _____

iib. Receiving Facility: _____ Town: _____ State: _____

☐ c. Landfill ☐ i. Cover Estimated volume in cubic yards _____

Receiving Facility: _____ Town: _____ State: _____

☐ ii. Disposal Estimated volume in cubic yards _____

Receiving Facility: _____ Town: _____ State: _____

☐ 16. Removal of Drums, Tanks, or Containers:

a. Describe Quantity and Amount: _____

b. Receiving Facility: _____ Town: _____ State: _____

c. Receiving Facility: _____ Town: _____ State: _____

☐ 17. Removal of Other Contaminated Media:

a. Specify Type and Volume: _____

☐ 18. Other Response Actions:

Describe: _____

☐ 19. Use of Innovative Technologies:

Describe: _____

E. LSP SIGNATURE AND STAMP:

I attest under the pains and penalties of perjury that I have personally examined and am familiar with this transmittal form, including any and all documents accompanying this submittal. In my professional opinion and judgment based upon application of (i) the standard of care in 309 CMR 4.02(1), (ii) the applicable provisionsof 309 CMR 4.02(2) and (3), and 309 CMR 4.03(2), and (iii) the provisions of 309 CMR 4.03(3), to the best of my knowledge, information and belief,

> if Section B of this form indicates that an **Immediate Response Action Plan** is being submitted, the response action(s) that is(are) the subject of this submittal (i) has (have) been developed in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is(are) appropriate and reasonable to accomplish thepurposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (iii) complies(y) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> if Section B of this form indicates that an **Imminent Hazard Evaluation** is being submitted, this Imminent Hazard Evaluation was developed in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, and the assessment activity(ies) undertaken to support this Imminent Hazard Evaluation comply(ies) with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000;

> if Section B of this form indicates that an **Immediate Response Action Status Report** and/or a **Remedial Monitoring Report** is(are) being submitted, the response action(s) that is (are) the subject of this submittal (i) is (are) being implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000,(ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (iii) comply(ies) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> if Section B of this form indicates that an **Immediate Response Action Completion Statement** or a request to **Terminate an Active Remedial System or Response Action(s) Taken to Address an Imminent Hazard** is being submitted, the response action(s) that is(are) the subject of this submittal (i) has (have) been developed and implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is(are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (iii) comply(ies) with the identified provisions of all orders, permits, and approvals identified in this submittal.

I am aware that significant penalties may result, including, but not limited to, possible fines and imprisonment, if I submit information which I know to be false, inaccurate or materially incomplete.

1. LSP #: 2647

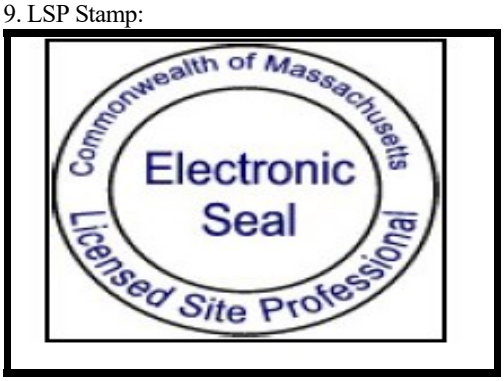
2. First Name: DAVID E 3. Last Name: LEONE

4. Telephone: 781-278-5766 5. Ext: 6. Email: davide.leone@gza.com

7. Signature: DAVID E LEONE

8. Date: 9/5/2024 *(mm/dd/yyyy)*

9. LSP Stamp:



Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

Immediate Response Action (IRA) Transmittal Form
Pursuant to 310 CMR 40.0424 - 40.0427 (Subpart D)

BWSC 105

Release Tracking Number
4 - 26179

F. PERSON UNDERTAKING IRA:

1. Check all that apply: ☐ a. change in contact name ☐ b. change of address ☐ c. change in the person undertaking response actions

2. Name of Organization: BARNSTABLE COUNTY COMMISSIONERS

3. Contact First Name: PAUL 4. Last Name: RUSZALA

5. Street: 3195 MAIN ST 6. Title:

7. City/Town: BARNSTABLE 8. State: MA 9. Zip Code: 026301105

10. Telephone: 508-375-6643 11. Ext: 12. Email:

G. RELATIONSHIP TO RELEASE OR THREAT OF RELEASE OF PERSON UNDERTAKING IRA:

☐ Check here to change relationship

☑ 1. RP or PRP ☐ a. Owner ☐ b. Operator ☐ c. Generator ☐ d. Transporter

☑ e. Other RP or PRP Specify Relationship: NON-SPECIFIED PRP

☐ 2. Fiduciary, Secured Lender or Municipality with Exempt Status (as defined by M.G.L. c. 21E, s. 2)

☐ 3. Agency or Public Utility on a Right of Way (as defined by M.G.L. c. 21E, s. 5(j))

☐ 4. Any Other Person Undertaking Response Actions: Specify Relationship:

H. REQUIRED ATTACHMENT AND SUBMITTALS:

☐ 1. Check here if any Remediation Waste, generated as a result of this IRA, will be stored, treated, managed, recycled or reused at the site following submission of the IRA Completion Statement. If this box is checked, you must submit one of the following plans, along with the appropriate transmittal form.

☐ a. A Release Abatement Measure (RAM) Plan (BWSC106) ☐ b. Phase IV Remedy Implementation Plan (BWSC108)

☑ 2. Check here if the Response Action(s) on which this opinion is based, if any, are (were) subject to any order(s), permit(s) and/or approval(s) issued by MassDEP or EPA. If the box is checked, you MUST attach a statement identifying the applicable provisions thereof.

☑ 3. Check here to certify that the Chief Municipal Officer and the Local Boardof Health were notified of the implementation of an Immediate Response Action taken to control, prevent, abate or eliminate an Imminent Hazard.

☐ 4. Check here to certify that the Chief Municipal Officer and the Local Boardof Health were notified of the submittal of a Completion Statement for an Immediate Response Action taken to control, prevent, abate or eliminate an Imminent Hazard.

☐ 5. Check here if any non-updatable information provided on this form is incorrect, e.g. Release Address/Location Aid. Send corrections to BWSC.eDEP@Mass.Gov.

☑ 6. Check here to certify that the LSP Opinion containing the material facts, data, and other information is attached.

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

Immediate Response Action (IRA) Transmittal Form
Pursuant to 310 CMR 40.0424 - 40.0427 (Subpart D)

BWSC 105

Release Tracking Number
4 - 26179

I. CERTIFICATION OF PERSON UNDERTAKING IRA:

1. I, PAUL RUSZALA, attest under the pains and penalties of perjury (i) that I have personally examined and am familiar with the information contained in this submittal, including any and all documents accompanying this transmittal form; (ii) that, based on my inquiry of the/those individual(s) immediately responsible for obtaining the information, the material information contained herein is, to the best of my knowledge, information and belief, true, accurate and complete; (iii) that, to the best of my knowledge, information and belief, I/the person(s) or entity(ies) on whose behalf this submittal is made satisfy(ies) the criteria in 310 CMR 40.0183(2); (iv) that I/the person(s) or entity(ies) on whose behalf this submittal is made have provided notice in accordance with 310 CMR 40.0183(5); and (v) that I am fully authorized to make this attestation on behalf of the person(s) or entity(ies) legally responsible for this submittal. I/the person(s) or entity(ies) on whose behalf this submittal is made is/are aware that there are significant penalties, including, but not limited to, possible fines and imprisonment, for willfully submitting false, inaccurate, or incomplete information.

2. By: PAUL RUSZALA
3. Title:
4. For: BARNSTABLE COUNTY COMMISSIONERS
5. Date: 9/5/2024 (mm/dd/yyyy)

☐ 6. Check here if the address of the person providing certification is different from address recorded in Section F.

7. Street:
8. City/Town:
9. State:
10. Zip Code:
11. Telephone:
12. Ext:
13. Email:

YOU ARE SUBJECT TO AN ANNUAL COMPLIANCE ASSURANCE FEE OF UP TO $10,000 PER BILLABLE YEAR FOR THIS DISPOSAL SITE. YOU MUST LEGIBLY COMPLETE ALL RELEVANT SECTIONS OF THIS FORM OR DEP MAY RETURN THE DOCUMENT AS INCOMPLETE. IF YOU SUBMIT AN INCOMPLETE FORM, YOU MAY BE PENALIZED FOR MISSING A REQUIRED DEADLINE.

Date Stamp (DEP USE ONLY:)

Received by DEP on
9/5/2024 10:28:02 AM

Appendix D – Response to Public Comments

APPENDIX D – PUBLIC INVOLVEMENT PLAN COMMENTS AND RESPONSES	
Comment Code	**Entity or Individual**
Cambareri	Thomas Cambareri, 62 Joan Road, Centerville, MA 02632
Comments Received on Draft IRA Plan Modification as of July 9, 2024	
Cambareri-1	Comment: Although the intended PRB configuration appears as if it will contain further releases from upgradient, it is prudent to continue to monitor PFAS in the PFW-2 source area. Response: GZA plans to monitor PFAS levels in the source area near PFW-2. Monitoring results will be provided in a future status report for RTN 4-26179. In addition, GZA notes the proposed pilot study is limited in area and designed to assess the efficacy of a PRB prior to full-scale implementation. We anticipate that full-scale implementation would involve a significantly longer PRB and/or multiple PRBs. If the pilot test is successful as expected, full-scale implementation would be conducted under a separate IRA Plan Modification.
Cambareri-2	Comment: The description of prior activities indicates the reactivation of the existing well PRW-4 from the former petroleum release. The petroleum release from 1986 was partially addressed by a pump and treat system installed in 1994 which was finally shut down in 2004. PRW-4 and many of the “PC” wells were installed in 2007 for the 2006 perchlorate release. Response: This IRA Plan Modification has been revised to reflect the history of PRW-4 as noted .
Cambareri-3	Comment: The IRA description indicates that the new 2019 mobile treatment unit to supplement the 2015 pump and treat system did little to expand its pumping capacity. In fact, the pumping is reduced to less than 20 gpm. The PFOS concentrations from PRW-4 could be due to the low pumping rate. Response: Noted.
Cambareri-4	Comment: All of the prior wells for the BCFTA were installed with hollow stems, solid stems and direct push methods. While the approach of using wash and drive has merit for the collection of subsurface soils, the distinct difference between sand and more compact silts and clays is the most important component to determine. The difference is fairly noticeable to an experienced crew. I recommend the use of dry drilling methods when practical. Response: Alternate or multiple drilling methods may be selected to meet the needs of individual drilling tasks and associated data needs.
Cambareri-5	Comment: I expect that the Final IRA Plan and status reports will contain more detailed figures of the geology and draft layout of the PRB installation.

	Response: Detailed figures presenting the layout of the PRB pilot test area and geological cross-sections will be provided in a future IRA Status Report and/or in an IRA Plan Modification prior to implementation of a full-scale PRB.

Appendix E – MassDEP Approval

Daniel Scanlon

From: Gallagher, Angela (DEP) <angela.gallagher@mass.gov>
Sent: Monday, August 26, 2024 1:17 PM
To: Daniel Scanlon; Paul Ruszala; David E. Leone; John Paquin; Jennifer McKechnie
Cc: Brolowski, Navpreet (DEP); Handrahan, John (DEP)
Subject: [EXTERNAL] IRA Modification for Plume Stop - MassDEP approval

Good afternoon,
MassDEP has reviewed the IRA modification as well as the proprietary ingredients that make up the Regenesis PlumeStop.

At this time, MassDEP approves the IRA Modification with the use of Plume Stop and the proposed baseline and post-injection groundwater monitoring. The IRA Plan shall comply with the MCP, and in particular, 310 CMR 40.0046.

Please feel free to reach out with any questions.

Take care,
Angela Gallagher

MassDEP
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