From:	Baganha, Paulo A CW3 USARMY NG MAARNG (USA)
To:	Downing, Jane
Cc:	Springborg, Denise; Su, Chunming; Wilkin, Rick; Traviglia, Andrea; Azevedo, Alex; Porter, Matthew N COL USARMY NG MAARNG (USA); Bagaglio, John S COL USARMY NG MAANG (USA); McDonough, Alexander VINCENT (Alex) MAJ USARMY NG MAARNG (USA); Driscoll, Keith J NFG (USA); Ciaranca, Michael A NFG NG MAARNG (USA); len.pinaud@mass.gov
Subject:	RE: MPMGR Meeting Follow Up
Date:	Tuesday, November 15, 2022 12:34:04 PM

Good afternoon Jane,

The requested information will be sent via DoD SAFE within the next hour. There will be a total of eight documents to help assist the team in background levels and chromium levels. Please do a keyword search of the larger reports for chromium and you will find the necessary information you are looking for. If you have any questions please do not hesitate to contact us.

Thank you,
Paulo

Regards,

Mr. Paulo A. Baganha
Environmental Program Manager

JFHQ-MA CFMO
2 Randolph Road
Hanscom AFB, MA 01731
Office: 339-202-3960
Cell: 508-958-2709

From: Downing, Jane <Downing.Jane@epa.gov>
Sent: Monday, November 14, 2022 1:52 PM
To: Baganha, Paulo A CW3 USARMY NG MAARNG (USA) <paulo.a.baganha.mil@army.mil>
Cc: Springborg, Denise <Springborg.Denise@epa.gov>; Su, Chunming <Su.Chunming@epa.gov>; Wilkin, Rick <Wilkin.Rick@epa.gov>; Traviglia, Andrea <Traviglia.Andrea@epa.gov>; Azevedo, Alex <Azevedo.Alexandra@epa.gov>; Porter, Matthew N COL USARMY NG MAARNG (USA) <matthew.n.porter.mil@army.mil>; Bagaglio, John S COL USARMY NG MAANG (USA) <john.s.bagaglio.mil@army.mil>; McDonough, Alexander VINCENT (Alex) MAJ USARMY NG MAARNG (USA) <alexander.v.mcdonough.mil@army.mil>; Driscoll, Keith J NFG (USA) <keith.j.driscoll.nfg@army.mil>; Ciaranca, Michael A NFG NG MAARNG (USA) <michael.a.ciaranca.nfg@army.mil>; len.pinaud@mass.gov
Subject: [Non-DoD Source] RE: MPMGR Meeting Follow Up

Hi Paulo
Hope all is well.

Upon further reflection on the latest MAARNG response , it appears that there are still 2 outstanding issues – see EPA request:
Also provide 1) list of JBCC background levels and 2) any sampling data from any range which speciates chromium into chromium III and chromium VI;

We ask that you provide the above information as soon as possible, but no later than Wednesday , 11/16.

Let me know if questions

Thanks and
Have a Good Day
Jane

From: Baganha, Paulo A CW3 USARMY NG MAARNG (USA) <paulo.a.baganha.mil@army.mil>
Sent: Friday, November 04, 2022 4:32 PM
To: Downing, Jane <Downing.Jane@epa.gov>
Cc: Springborg, Denise <Springborg.Denise@epa.gov>; Su, Chunming <Su.Chunming@epa.gov>; Wilkin, Rick <Wilkin.Rick@epa.gov>; Traviglia, Andrea <Traviglia.Andrea@epa.gov>; Azevedo, Alexandra <Azevedo.Alexandra@epa.gov>; Porter, Matthew N COL USARMY NG MAARNG (USA) <matthew.n.porter.mil@army.mil>; Bagaglio, John S COL USARMY NG MAANG (USA) <john.s.bagaglio.mil@army.mil>; McDonough, Alexander VINCENT (Alex) MAJ USARMY NG MAARNG (USA) <alexander.v.mcdonough.mil@army.mil>; Driscoll, Keith J NFG (USA) <keith.j.driscoll.nfg@army.mil>; Ciaranca, Michael A NFG NG MAARNG (USA) <michael.a.ciaranca.nfg@army.mil>; len.pinaud@mass.gov
Subject: RE: MPMGR Meeting Follow Up

Good afternoon Jane,

Please find the MAARNG responses to the comments from your October 14th email. If you have any questions, please do not hesitate to contact us. We look forward to hearing from you and your team. Have a wonderful weekend!

Regards,

Mr. Paulo A. Baganha
Environmental Program Manager

JFHQ-MA CFMO
2 Randolph Road

Hanscom AFB, MA 01731
Office: 339-202-3960
Cell: 508-958-2709

From: Downing, Jane <Downing.Jane@epa.gov>
Sent: Friday, October 14, 2022 3:23 PM
To: Porter, Matthew N COL USARMY NG MAARNG (USA) <matthew.n.porter.mil@army.mil>; Bagaglio, John S COL USARMY NG MAANG (USA) <john.s.bagaglio.mil@army.mil>; McDonough, Alexander VINCENT (Alex) MAJ USARMY NG MAARNG (USA) <alexander.v.mcdonough.mil@army.mil>; Baganha, Paulo A CW3 USARMY NG MAARNG (USA) <paulo.a.baganha.mil@army.mil>; Driscoll, Keith J NFG (USA) <keith.j.driscoll.nfg@army.mil>; Ciaranca, Michael A NFG NG MAARNG (USA) <michael.a.ciaranca.nfg@army.mil>; len.pinaud@mass.gov
Cc: Springborg, Denise <Springborg.Denise@epa.gov>; Su, Chunming <Su.Chunming@epa.gov>; Wilkin, Rick <Wilkin.Rick@epa.gov>; Traviglia, Andrea <Traviglia.Andrea@epa.gov>; Azevedo, Alexandra <Azevedo.Alexandra@epa.gov>
Subject: [Non-DoD Source] MPMGR Meeting Follow Up

Greetings
Hope your week went well

Thank you again for participating, with Massachusetts Department of Environmental Protection, in our informative face-to-face meeting last week to discuss a number of matters relating to the proposed Multi-Purpose Machine Gun Range (MPMGR). To re-emphasize points raised at the meeting, we discussed the Sole Source Aquifer (SSA) criteria for determining impacts, and the need to develop plans and designs to reduce the potential for the release of contaminants, to the maximum extent feasible. For any decision yet to be made under the SSA program, this goal should be seriously and wholistically pursued by the Massachusetts Army National Guard (MAARNG) for the proposed MPMGR plans, as well as the other Small Arms Ranges (SARs).

A. According to our notes, here are some follow up items, in no particular order of priority:

1. To establish the contaminant baseline for the KD range, review the tables of sampling data provided electronically by EPA . Chunming Su will discuss discrepancies with your Points of Contact; Also provide list of JBCC background levels and any sampling data which speciates chromium into chromium III and chromium VI;
2. MAARNG to look into differences in chromium levels between ammunition types and alternates;
3. Develop a program for use of metal detectors to be utilized during regular inspections in areas of greatest contaminant loading, including base of berms and firing line;
4. Develop a plan to offset the use of 1.3 million bullets per year at the proposed MPMGR, through an aggressive scheduled bullet retrieval program at the KD Range and other SARs. EPA previously requested a twice per year bullet retrieval at the KD range. In addition to

bullet retrieval of currently inactive ranges, other active SARs need to be placed under an aggressive schedule to retrieve bullets which will help offset the proposed annual volume of 1.3 million bullets at the KD range. Calculations of bullets proposed to be retrieved at the KD range and other SARs, on an initial and annual basis, will be provided with the plan;

5. Investigate and develop options for design changes, including use of blocks, which will increase the ability to contain and retrieve contaminants and under shots that may accumulate at the toe of the berms;
6. Revise the proposed Stormwater Management Plan to address EPA comments, including stormwater sampling;
7. Develop options for the design and management of impermeable covers for the berms which will minimize the percolation of rainwater into the berms and thus reduce the dissolution of contaminants, and maintain berm integrity; These covers could be utilized at KD range during down times (e.g. Monday through Thursday), as well as at other SARs.
8. Community Engagement Plan. Provide a plan for enhanced community engagement, including options for real-time visual display of proposed project's construction and other operations, and a means for continuous citizen Q&As and feedback. Options may also include a photo log and posting of inspection reports.
9. Copper Leaching Study Draft Report.

In addition to the above, based on ammunition data, we request the following:

~ Develop Best Management Practices to reduce the amount of nitrocellulose, nitroglycerin, and other explosives expelled and deposited at the firing line.

B. Here are Areas that are currently or will be in design or operational plans for MPMGR:

1. In the spirit of continuous improvement, the State of the Reservation Report and/or OMMP updates will, at least annually, include a Best Management Practices (BMPs) Section which evaluates the effectiveness of current BMPs and identifies emerging BMPs, monitoring advancements, and technologies, including green ammunition, to be utilized, at the direction of the Environmental Management Commission (EMC), at the KD range and other SARs. This information should be highlighted and shared with the public;
2. Visual inspections of the MPMGR will occur, at least, on a quarterly basis, after each training event, after storms, and at the direction of the EMC EO;
3. Sufficient lysimeters will be deployed at representative toes of berms;
4. Native vegetation and upkeep for range floor and berms;
5. Staggered use of firing lanes to prevent hot spots- to be incorporated into Standard Operating Procedures (SOPs);
6. Use of land contouring to prevent stormwater ponding within the range floor;
7. Continued coordination and joint planning with communities and public water suppliers to prepare for and respond to emergencies;
8. No use of fire suppressant chemicals;

C. Here are Areas which, based on previous experience and knowledge, MAARNG described as technically infeasible for the MPMGR:

1. Bullet traps, including shock absorbing concrete (SACON), self-healing rubber, and shredded rubber traps;
2. Wing walls of geotextile materials;
3. Wind breaks (mature shrubs) on or behind berms;
4. Shot Curtains;
5. Others.

EPA believes that it is important to document, for the record, that designs provided in Section C have been investigated and determined to be technically infeasible. To that end, prepare a report or response that provides references to documents or further information for each item.

Given the timing of events planned for the Fall, we request that you provide items outlined in Sections A and C, no later than October 28,2022. Interim deliverables should be submitted, as feasible, as soon as possible, before this deadline. If such deadlines are not feasible, provide explanations and alternate deadlines.

EPA acknowledges that we will continue to evaluate information and reach conclusions relating to contaminants of concern, action levels, and monitoring details. We will be in touch.

Please note, this is not a final agency decision. EPA has not yet reached any preliminary decisions regarding the Sole Source Aquifer Determination of impacts from the proposed MPMGR. In the coming weeks, we will continue to gather the facts, assess the plans, and brief upper management. We encourage continued close coordination between all parties.

Thank you for your engagement in this critical environmental matter. Let me know if any questions or concerns.

Have a Good Day
Jane

Jane Downing
Chief, Drinking Water and Municipal Assistance Branch
EPA Region 1
617-918-1571

Azevedo, Alex (she/they)

Subject: FW: MPMGR Meeting Follow Up

From: Baganha, Paulo A CW3 USARMY NG MAARNG (USA) <paulo.a.baganha.mil@army.mil>
Sent: Wednesday, November 9, 2022 7:24 AM
To: Downing, Jane <Downing.Jane@epa.gov>
Cc: Springborg, Denise <Springborg.Denise@epa.gov>; Su, Chunming <Su.Chunming@epa.gov>; Wilkin, Rick <Wilkin.Rick@epa.gov>; Traviglia, Andrea <Traviglia.Andrea@epa.gov>; Azevedo, Alexandra <Azevedo.Alexandra@epa.gov>; Porter, Matthew N COL USARMY NG MAARNG (USA) <matthew.n.porter.mil@army.mil>; Bagaglio, John S COL USARMY NG MAANG (USA) <john.s.bagaglio.mil@army.mil>; McDonough, Alexander VINCENT (Alex) MAJ USARMY NG MAARNG (USA) <alexander.v.mcdonough.mil@army.mil>; Driscoll, Keith J NFG (USA) <keith.j.driscoll.nfg@army.mil>; Ciaranca, Michael A NFG NG MAARNG (USA) <michael.a.ciaranca.nfg@army.mil>; len.pinaud@mass.gov; Pinaud, Leonard (DEP) <leonard.pinaud@mass.gov>
Subject: RE: MPMGR Meeting Follow Up

Good morning Jane,

The MAARNG will obtain the requested data and get it to you and your team by the requested date. If you require any further information, do not hesitate to ask.

Regards,

Mr. Paulo A. Baganha
Environmental Program Manager

JFHQ-MA CFMO
2 Randolph Road
Hanscom AFB, MA 01731
Office: 339-202-3960
Cell: 508-958-2709

From: Downing, Jane <Downing.Jane@epa.gov>
Sent: Tuesday, November 8, 2022 12:22 PM
To: Baganha, Paulo A CW3 USARMY NG MAARNG (USA) <paulo.a.baganha.mil@army.mil>
Cc: Springborg, Denise <Springborg.Denise@epa.gov>; Su, Chunming <Su.Chunming@epa.gov>; Wilkin, Rick <Wilkin.Rick@epa.gov>; Traviglia, Andrea <Traviglia.Andrea@epa.gov>; Azevedo, Alexandra <Azevedo.Alexandra@epa.gov>; Porter, Matthew N COL USARMY NG MAARNG (USA) <matthew.n.porter.mil@army.mil>; Bagaglio, John S COL USARMY NG MAANG (USA) <john.s.bagaglio.mil@army.mil>; McDonough, Alexander VINCENT (Alex) MAJ USARMY NG MAARNG (USA) <alexander.v.mcdonough.mil@army.mil>; Driscoll, Keith J NFG (USA) <keith.j.driscoll.nfg@army.mil>; Ciaranca, Michael A NFG NG MAARNG (USA) <michael.a.ciaranca.nfg@army.mil>; len.pinaud@mass.gov; Pinaud, Leonard (DEP) <leonard.pinaud@mass.gov>
Subject: [Non-DoD Source] RE: MPMGR Meeting Follow Up

Hi Paulo and Everyone

Upon review of the 2021 sampling data from the Small Arms Ranges at Joint Base Cape Cod provided in the State of the Reservation Report, we observed that pore water and groundwater sampling results for antimony were greater than the respective OMMP Action Level (3 ppb) and Maximum Contaminant Level (6 ppb). In such cases, antimony was reported at 12 ppb, the reporting limit, with a notation of non-detect (U). That is unacceptable because it doesn't provide sampling results less than the action levels/MCLs which are necessary for determining appropriate surveillance and response.

Similarly, Lead in water is mostly presented at a result of 9 ppb, with an undetected qualifier (U). This matches what was used as the Lead's Reporting Limit, which is also above the OMMP Action Level.

Therefore, starting with the Sampling Reports for 2021 and 2020, EPA requests that MAARNG provide, for all small arms ranges, all antimony and lead pore water and groundwater sampling results between the method detection limit and reporting limits, even if such results will be denoted as estimated. This will provide more detailed information as to the presence of antimony and lead in pore water and groundwater. Please provide this information by COB Thursday November 10, 2022.

To better understand how the data were collected and reported, please provide the Quality Assurance Project Plan (QAPP) or other planning documents that were developed for MAARNG for the Small Arms Ranges. Based on the reported analytical results, EPA is concerned about the ability to meet all sampling objectives.

Let me know if questions
Thanks
Jane

Jane Downing
Chief, Drinking Water and Municipal Assistance Branch
EPA Region 1
617-918-1571

From: Downing, Jane
To: Baganha, Paulo A CW3 USARMY NG MAARNG (USA)
Cc: Porter, Matthew N COL USARMY NG MAARNG (USA); Bagaglio, John S COL USARMY NG MAANG (USA); McDonough, Alexander VINCENT (Alex) MAJ USARMY NG MAARNG (USA); Driscoll, Keith J NFG (USA); Ciaranca, Michael A NFG NG MAARNG (USA); len.pinaud@mass.gov; Springborg, Denise; Su, Chunming; Wilkin, Rick; Traviglia, Andrea; Azevedo, Alexandra
Subject: Re: MPMGR Meeting Follow Up
Date: Sunday, October 23, 2022 11:02:35 AM

Thank you Paulo for the email informing us that your responses will be submitted on November 4. Within that period, we encourage you to submit any interim responses as they may become available.

Let us know if questions
Have a good day
Jane

Jane Downing
Chief, Drinking Water and Municipal Assistance Branch
EPA Region 1
617-918-1571

Sent from my iPhone

> On Oct 20, 2022, at 2:49 PM, Baganha, Paulo A CW3 USARMY NG MAARNG (USA) <paulo.a.baganha.mil@army.mil> wrote:
>
> Good afternoon Jane,
>
> In order for the MAARNG to provide the most appropriate responses to the items in the sections below, we need additional time to coordinate with National Guard Bureau and other entities (USACE). We request one additional week to obtain the responses and submit back for your review. That would put us at November 4, 2022 for the deadline date. Please let me know if you have any questions.
>
> Regards,
>
> Mr. Paulo A. Baganha
> Environmental Program Manager
>
> JFHQ-MA CFMO
> 2 Randolph Road
> Hanscom AFB, MA 01731
> Office: 339-202-3960
> Cell: 508-958-2709

From: Downing, Jane <Downing.Jane@epa.gov>
Sent: Friday, October 14, 2022 3:23 PM
To: Porter, Matthew N COL USARMY NG MAARNG (USA) <matthew.n.porter.mil@army.mil>; Bagaglio, John S COL USARMY NG MAANG (USA) <john.s.bagaglio.mil@army.mil>; McDonough, Alexander VINCENT (Alex) MAJ USARMY NG MAARNG (USA) <alexander.v.mcdonough.mil@army.mil>; Baganha, Paulo A CW3 USARMY NG MAARNG (USA) <paulo.a.baganha.mil@army.mil>; Driscoll, Keith J NFG (USA) <keith.j.driscoll.nfg@army.mil>; Ciaranca, Michael A NFG NG MAARNG (USA) <michael.a.ciaranca.nfg@army.mil>; len.pinaud@mass.gov
Cc: Springborg, Denise <Springborg.Denise@epa.gov>; Su, Chunming <Su.Chunming@epa.gov>; Wilkin, Rick <Wilkin.Rick@epa.gov>; Traviglia, Andrea <Traviglia.Andrea@epa.gov>; Azevedo, Alexandra <Azevedo.Alexandra@epa.gov>
Subject: [Non-DoD Source] MPMGR Meeting Follow Up

Greetings
Hope your week went well

Thank you again for participating, with Massachusetts Department of Environmental Protection, in our informative face-to-face meeting last week to discuss a number of matters relating to the proposed Multi-Purpose Machine Gun Range (MPMGR). To re-emphasize points raised at the meeting, we discussed the Sole Source Aquifer (SSA) criteria for determining impacts, and the need to develop plans and designs to reduce the potential for the release of contaminants, to the maximum extent feasible. For any decision yet to be made under the SSA program, this goal should be seriously and wholistically pursued by the Massachusetts Army National Guard (MAARNG) for the proposed MPMGR plans, as well as the other Small Arms Ranges (SARs).

A. According to our notes, here are some follow up items, in no particular order of priority:

1. To establish the contaminant baseline for the KD range, review the tables of sampling data provided electronically by EPA . Chunming Su will discuss discrepancies with your Points of Contact; Also provide list of JBCC background levels and any sampling data which speciates chromium into chromium III and chromium VI;
2. MAARNG to look into differences in chromium levels between ammunition types and alternates;
3. Develop a program for use of metal detectors to be utilized during regular inspections in areas of greatest contaminant loading, including base of berms and firing line;
4. Develop a plan to offset the use of 1.3 million bullets per year at the proposed

MPMGR, through an aggressive scheduled bullet retrieval program at the KD Range and other SARs. EPA previously requested a twice per year bullet retrieval at the KD range. In addition to bullet retrieval of currently inactive ranges, other active SARs need to be placed under an aggressive schedule to retrieve bullets which will help offset the proposed annual volume of 1.3 million bullets at the KD range. Calculations of bullets proposed to be retrieved at the KD range and other SARs, on an initial and annual basis, will be provided with the plan;

5. Investigate and develop options for design changes, including use of blocks, which will increase the ability to contain and retrieve contaminants and under shots that may accumulate at the toe of the berms;
6. Revise the proposed Stormwater Management Plan to address EPA comments, including stormwater sampling;
7. Develop options for the design and management of impermeable covers for the berms which will minimize the percolation of rainwater into the berms and thus reduce the dissolution of contaminants, and maintain berm integrity; These covers could be utilized at KD range during down times (e.g. Monday through Thursday), as well as at other SARs.
8. Community Engagement Plan. Provide a plan for enhanced community engagement, including options for real-time visual display of proposed project's construction and other operations, and a means for continuous citizen Q&As and feedback. Options may also include a photo log and posting of inspection reports.
9. Copper Leaching Study Draft Report.

In addition to the above, based on ammunition data, we request the following:

~ Develop Best Management Practices to reduce the amount of nitrocellulose, nitroglycerin, and other explosives expelled and deposited at the firing line.

B. Here are Areas that are currently or will be in design or operational plans for MPMGR:

1. In the spirit of continuous improvement, the State of the Reservation Report and/or OMMP updates will, at least annually, include a Best Management Practices (BMPs) Section which evaluates the effectiveness of current BMPs and identifies emerging BMPs, monitoring advancements, and technologies, including green ammunition, to be utilized, at the direction of the Environmental Management Commission (EMC), at the KD range and other SARs. This information should be highlighted and shared with the public;
2. Visual inspections of the MPMGR will occur, at least, on a quarterly basis, after each training event, after storms, and at the direction of the EMC EO;
3. Sufficient lysimeters will be deployed at representative toes of berms;
4. Native vegetation and upkeep for range floor and berms;

5. Staggered use of firing lanes to prevent hot spots- to be incorporated into Standard Operating Procedures (SOPs);
6. Use of land contouring to prevent stormwater ponding within the range floor;
7. Continued coordination and joint planning with communities and public water suppliers to prepare for and respond to emergencies;
8. No use of fire suppressant chemicals;

C. Here are Areas which, based on previous experience and knowledge, MAARNG described as technically infeasible for the MPMGR:

1. Bullet traps, including shock absorbing concrete (SACON), self-healing rubber, and shredded rubber traps;
2. Wing walls of geotextile materials;
3. Wind breaks (mature shrubs) on or behind berms;
4. Shot Curtains;
5. Others.

EPA believes that it is important to document, for the record, that designs provided in Section C have been investigated and determined to be technically infeasible. To that end, prepare a report or response that provides references to documents or further information for each item.

Given the timing of events planned for the Fall, we request that you provide items outlined in Sections A and C, no later than October 28,2022. Interim deliverables should be submitted, as feasible, as soon as possible, before this deadline. If such deadlines are not feasible, provide explanations and alternate deadlines.

EPA acknowledges that we will continue to evaluate information and reach conclusions relating to contaminants of concern, action levels, and monitoring details. We will be in touch.

Please note, this is not a final agency decision. EPA has not yet reached any preliminary decisions regarding the Sole Source Aquifer Determination of impacts from the proposed MPMGR. In the coming weeks, we will continue to gather the facts, assess the plans, and brief upper management. We encourage continued close coordination between all parties.

Thank you for your engagement in this critical environmental matter. Let me know if any questions or concerns.

Have a Good Day

Jane

Jane Downing
Chief, Drinking Water and Municipal Assistance Branch
EPA Region 1
617-918-1571

The following are MAARNG responses to an email received from EPA (Jane Downing) 14 October 2022. The email was a follow up to a meeting that was conducted at EPA Region 1 Headquarters (5 October 2022) and reads as follows:

(EPA): Thank you again for participating, with Massachusetts Department of Environmental Protection, in our informative face-to-face meeting last week to discuss a number of matters relating to the proposed Multi-Purpose Machine Gun Range (MPMGR). To re-emphasize points raised at the meeting, we discussed the Sole Source Aquifer (SSA) criteria for determining impacts, and the need to develop plans and designs to reduce the potential for the release of contaminants, to the maximum extent feasible. For any decision yet to be made under the SSA program, this goal should be seriously and wholistically pursued by the Massachusetts Army National Guard (MAARNG) for the proposed MPMGR plans, as well as the other Small Arms Ranges (SARs).

Question	Sub Question #	EPA Question/Request	MAARNG Response
A		**According to our notes, here are some follow up items, in no particular order of priority:**	
A	1	To establish the contaminant baseline for the KD range, review the tables of sampling data provided electronically by EPA. Chunming Su will discuss discrepancies with your Points of Contact; Also provide list of JBCC background levels and any sampling data which speciates chromium into chromium III and chromium VI;	A meeting is scheduled for 1 November with Dr Su Cunming, EPA and representatives from the Impact Area Groundwater Study Program (IAGWSP) and MAARNG to address baseline conditions at KD Range.
A	2	MAARNG to look into differences in chromium levels between ammunition types and alternates;	IAGWSP will provide chromium data for historic ammunition used on KD Range. As for current ammunition, the Ball 5.56 EPR (not tracer) steel penetrator (iron) has trace metals to include chromium. The Army inventory system does not differentiate between the alternative MDS rounds. See data sheet.
A	3	Develop a program for use of metal detectors to be utilized during regular inspections in areas of greatest contaminant loading, including base of berms and firing line;	The use of metal detectors is an unsustainable maintenance requirement for this range due to the current use of capture berms, interference of underground infrastructure, and man hour requirements to accomplish the task when balanced against the risk of contamination from metals from rounds fired on the MPMGR. Due to the issues listed above the MAARNG assesses this option as not feasible. When the range is ready for projectile harvest, metal detectors will be used to determine the limits of bullet pocket clean up at the base of the berms and the range floor in front of the berms.

A	4	Develop a plan to offset the use of 1.3 million bullets per year at the proposed MPMGR, through an aggressive scheduled bullet retrieval program at the KD Range and other SARs. EPA previously requested a twice per year bullet retrieval at the KD range. In addition to bullet retrieval of currently inactive ranges, other active SARs need to be placed under an aggressive schedule to retrieve bullets which will help offset the proposed annual volume of 1.3 million bullets at the KD range. Calculations of bullets proposed to be retrieved at the KD range and other SARs, on an initial and annual basis, will be provided with the plan;	The MAARNG will comply with the standards established through MGL Chapter 47, Acts of 2002 and the Environmental Performance Standards.
A	5	Investigate and develop options for design changes, including use of blocks, which will increase the ability to contain and retrieve contaminants and under shots that may accumulate at the toe of the berms;	Provides no containment benefit. Projectile capturing materials can have unintended consequences such as contributing contaminants to the environment and or changing soil chemistry. For example, SACON fractures causing dust that can change soil pH, i.e., geochemistry. Other examples such as DuraBlock contribute SVOCs and other substances of concern. The earthen backstop berms are designed to capture and contain projectiles so that they can be monitored and be harvested in an efficient fashion. The geochemistry of the range also retards metals movement. For copper there is sufficient calcium to immobilize copper. Copper projectiles have not been found to be a threat to groundwater at Joint Base Cape Cod.

A	6	Revise the proposed Stormwater Management Plan to address EPA comments, including stormwater sampling;	The stormwater management plan is prepared to provide stormwater management as required by the 2008 Massachusetts Stormwater Handbook and the National Pollutant Discharge Elimination System (NPDES) permit. Stormwater treatment is designed based on the Environmental Assessment, which stated that there are no surface waters or wetlands in or near the project location. The MS4 permit quality requirements are not required due to no surface waters or wetlands being present or discharged to. Stormwater control measures are designed in accordance with Volume 2, Chapter 2 of the Massachusetts Stormwater Management Handbook with extended detention basins and the sediment forebays were designed for pretreatment. The sediment forebays were designed for pretreatment into the extended detention basisns as depicted on the plans and stormwater details. Stormwater will be monitored in accordance with the Post Construction Stormwater Management Plan and under the Operations, Maintenance and Monitoring Plan (OMMP) for the range. MAARNG will sample stormwater infrastructures for a period of three years to have comparative data as part of the OMMP. All data will be included in the State of the Reservation Report and available for public review.
A	7	Develop options for the design and management of impermeable covers for the berms which will minimize the percolation of rainwater into the berms and thus reduce the dissolution of contaminants, and maintain berm integrity; These covers could be utilized at KD range during down times (e.g. Monday through Thursday), as well as at other SARs.	The MAARNG has reviewed potential options for impermeable covers for the berms and determined based on options currently available, impacts to the stability to the berms (no vegetation, will lack organics, and soil drying), and numbers of man hours required to implement installing and removing the covers prior to and after live fire events makes this option not feasible. Dissolution of projectiles has not been shown to be a threat to groundwater at Camp Edwards. Having berm structure with top soil (organics), root mass, and vegetation structure helps retard any dissolution of contaminants that may occur. Copper projectiles are elemental copper and are not dissolved in the surrounding environment short of the initial oxidation which is diminimius at best.

A	8	Community Engagement Plan. Provide a plan for enhanced community engagement, including options for real-time visual display of proposed project's construction and other operations, and a means for continuous citizen Q&As and feedback. Options may also include a photo log and posting of inspection reports.	The MAARNG has a staffed Community Involvement structure that provides public updates, prepares and disseminates information for upcoming meetings, structures and schedules town briefings and other community engagement activities. The MAARNG values community engagement and participates in many community events and public meetings throughout the year. The MAARNG also publishes the State of the Reservations Report, which documents all activity that occurred in the Upper Cape Water Supply Reserve over the previous year. The MAARNG will continue to refine its methods of engagement as needed and necessary.
A	9	Copper Leaching Study Draft Report.	The copper fate and transport study is currently being conducted by the United States Army Corp of Engineers (USACE). Due to unforeseen conditions and extensive delays at testing laboratories, lab analyses of samples taken is anticipated to be completed by the end of November 2022. Once all samples have been analyzed, data will be reviewed to develop the results and conclusion for the report. The draft report is anticipated to be complete by December 2022 for review. If the report becomes available sooner, it will be disseminated for review.
A	9b	In addition to the above, based on ammunition data, we request the following Develop Best Management Practices to reduce the amount of nitrocellulose, nitroglycerin, and other explosives expelled and deposited at the firing line.	There is no existing BMP to limit the discharge of propellant from the discharge of a rifle. Based on the CRRL study, Adsorption/Desorption Measurements of Nitroglycerin and Dinitrotoluene in Camp Edwards, Massachusetts Soil, Jay L. Clausen, C. Scott, N. Mulherin, S. Bigl, G. Gooch, T. Douglas, I. Osgerby, and B. Palm, February 2010 (Attached) and consistent with the USEPA letter dated 29 August 2011 (Attached) nitroglycerin is biodegraded and stable within the nitrocellulose fibers. Therefore, will not impact groundwater. From the USEPA letter referenced above: "Soil samples are currently collected from the three ranges for analysis of lead, copper, zinc, antimony, tungsten, and nitroglycerine. Nitroglycerin has been detected in soil samples at concentrations greater than the established interim action levels. However, recent studies have indicated that nitroglycerine is unlikely to impact groundwater at the levels observed in the soil on these ranges. Therefore, the requirement

			to sample for nitroglycerine in soils can be removed from the OMMP."
B		**Here are Areas that are currently or will be in design or operational plans for MPMGR:**	
B	1	In the spirit of continuous improvement, the State of the Reservation Report and/or OMMP updates will, at least annually, include a Best Management Practices (BMPs) Section which evaluates the effectiveness of current BMPs and identifies emerging BMPs, monitoring advancements, and technologies, including green ammunition, to be utilized, at the direction of the Environmental Management Commission (EMC), at the KD range and other SARs. This information should be highlighted and shared with the public;	Concur. Language is in OMMP. It is already a requirement.
B	2	Visual inspections of the MPMGR will occur, at least, on a quarterly basis, after each training event, after storms, and at the direction of the EMC EO;	Concur. Language is already in OMMP.
B	3	Sufficient lysimeters will be deployed at representative toes of berms;	Lysimeters will be placed in coordination with the Environmental Management Commission Environmental Officer (EMC EO) and Science Advisory Council (SAC) direction.
B	4	Native vegetation and upkeep for range floor and berms;	Concur. Already takes place (See Section A #7)
B	5	Staggered use of firing lanes to prevent hot spots- to be incorporated into Standard Operating Procedures (SOPs);	The staggering of firing lanes is already routinely done when feasible to reduce the wear on the targetry. It is standard practice to build full firing groups (all lanes occupied) prior to entering the range area to make best use of time and range resources.
B	6	Use of land contouring to prevent stormwater ponding within the range floor;	The MPMG range is designed such that the firing line and corresponding target emplacements with impact berms are graded to minimize the required grading while ensuring that the line of site for all targets can be achieved. The grading approach allows the site to maintain the existing drainage and runoff patterns to the greatest extent possible. Site grades gradually slope from north to south. Stormwater runoff generally flows off the range in a south, southeast direction towards the two detention basins along the southern end of the site.

B	7	Continued coordination and joint planning with communities and public water suppliers to prepare for and respond to emergencies;	The MAARNG values community engagement and participates in many community events and public meetings throughout the year. The MAARNG also publishes the State of the Reservations Report which documents all activity which occurred in the Upper Cape Water Supply Reserve over the previous year. The MAARNG will continue to refine its methods of engagement as needed and necessary (See Section A #8).
B	8	No use of fire suppressant chemicals;	a. A Use and Reporting of Wildland Firefighting Chemical Systems Camp Edwards and the Upper Cape Water Supply Standard Operating Procedure has been developed by the Joint Base Cape Cod Fire Department, the MAARNG Wildland Fire Coordinator, Camp Edwards Base Operations Manager with comment and input from the EMC EO. This SOP establishes a uniform procedure for permissible use and tracking of chemicals used with Wildland Firefighting Chemical Systems for wildland fire management purposes at Camp Edwards. b. The SOP guides the use of Wildland Firefighting Chemical Systems to the extent that is practicable during wildland fire operations (wildfire, prescribed fire, and wildland fire training), but shall not under any circumstances hinder management decisions and actions taken by an Incident Commander when protecting life and property.
C		**Here are Areas which, based on previous experience and knowledge, MAARNG described as technically infeasible for the MPMGR:**	
C	1	Bullet traps, including shock absorbing concrete (SACON), self-healing rubber, and shredded rubber traps;	Bullet traps were reviewed by the Small Arms Working group prior to the adoption of the STAPP (self healing rubber bullet trap) system which was used in support of lead fire ranges from 2007-2019. During the operation of these STAPP ranges, the cost, manpower requirements, and the unintended consequences of drainage issues and contaminants within the systems themselves proved the option as not feasible. In consultation with the EMC, earth and berm were determined to be the most effective capture medium for small arms ranges.
C	2	Wing walls of geotextile materials;	The make and size of wing walls to capture ricochets would render the range unusable due to obscuring line of sight to subsequent targets in the firers lane. Even if effective line of sight were established, the materials needed and additional inspections / maintenance to maintain the system are assessed to be not feasible.

C	3	Wind breaks (mature shrubs) on or behind berms;	Mature shrubs of the size needed to be effective wind breaks would render line of sight ineffective to subsequent targets. Trees surrounding the range floor serve as wind breaks.
C	4	Shot Curtains;	Shot curtains are currently designed to support shotguns. The energy transfer of shot pellets is significantly less than that of the weapon systems being reviewed in the Sole Source Aquifer review. Additionally, even if such a system existed, the size, operation, maintenance, and manpower requirements of such a system is not practical due to current weather patterns and possible interference with avian species in the area. A similar system was used on Lima range to capture possible overshot of 40 mm training purpose rounds and was found over 9 years of use and assessment to not be effective. Currently that range is undergoing renovation with the approval of the EMC EO for a more effective method to capture that type of round.
C	5	Others.	Over the life cycle of the partnership with the EPA, EMC, and the MAARNG various BMPs have been tested. A summary is listed below:
			· Sand Range Floor: During the evaluation of design options for Echo range a series of tests were conducted using a sand range floor to include raking the range floor to create “micro berms”. The operating theory was since sand is less dense then soils the sand would prevent ricochets. The results of testing showed the same rate of ricochet as a standard soil range floor and subsequent testing proved earth and berm to be the most effective capture medium.
			· Granular bullet traps: See answer to C1
			· DuraBlock: Testing was conducted at India Range (25 meter rifle / machine gun zero range) to determine if DuraBlock could be installed in the face of the berm to slow down the development of bullet pockets. Results of this testing showed that it was not practical to install DuraBlock on the face of earthen berms. Additionally, retrieval of rounds from the DuraBlock was not possible, and monitoring of CoCs from the DuraBlock itself would be required. For these reasons this option was determined to not be feasible and was concurred by the EMC EO.

			· After 15 years of successful compatible range use at Camp Edwards, managed earthen berms with proper range construction planning consisting of an accurate line of site and berm structure material (sand core with a topsoil cover) has become the standard for projectile capture, containment, and metal immobilization. This process includes opportunity for EMC comment, which is incorporated into the design.
		EPA believes that it is important to document, for the record, that designs provided in Section C have been investigated and determined to be technically infeasible. To that end, prepare a report or response that provides references to documents or further information for each item.	Answers provided above in each Section C response