NJDEP Technical Guidance Document: Response to Comments

Document "Characterization of Contaminated Ground Water Discharge to Surface Water Techincal Guidance"

Comment Period: June 9, 2015 to July 21, 2015

Committee Chairperson: Bill Hanrahan, NJDEP

Comment #	Page	Sect	Subsect	Comments	Response
1				General comment. The committee has done an excellent job of capturing the primary issues related to groundwater-surface water interaction and have provided a good amount of useful guidance that allows for professional judgment, which is appropriate given how different this pathway may be from site to site.	
2				General comment. Rigorous delineation and characterization of groundwater discharges to aquatic receiving environments can be technically challenging, and extremely expensive. NJDEP should emphasize that a tiered investigative strategy is acceptable, and provide guidance on how the tiering might vary depending on the site's complexity and potential risk from this pathway. A prioritization tool may have considerable value at this step. The current guidance lacks this framework and could lead investigators and/or regulators to conclude that a complex research project is required at all sites.	The comment is acknowledged. However, the Guidance is not intended to provide a comprehensive remedial investigation approach for "all sites". It is left to the investigator to decide which tools and methods are appropriate depending on the complexity of the site. A higher level of site complexity and/or the detection of potentially bioaccumulative contaminants could require a more comprehensive approach, as opposed to a relatively limited impact to ground water from a leaking fuel oil UST. Likewise, a small stream may require simple sampling and visual inspection while a large river may require the use of multiple tools to determine the location of the ground water discharge zone.
3				General Comment: Historic fill is prevalent at many sites. This document does not specifically address historic fill. Surface water investigation of historic fill sites will be onerous to facility operators and should not be required of parties who were not responsible for the placement of fill at their sites and upstream and downstream. As it stands, historic fill is required to be addressed as part of the remediating party's remedial approach for human health at a site. The time and expense associated with surface water evaluations for historic fill is unwarranted. Conceptually, requiring investigation and remediation of surface water impacts from historic fill sites is inconsistent with the NJDEP's policy for addressing groundwater impacts from historic fill material at the same site. Even when the historic fill material is contained within the property boundaries and is not a regional issue, NJAC 7:26E gives the option of simply proposing a CEA using the boundaries of the property without investigating and determining the extent of any fill-related groundwater plume. Furthermore, there is no requirement to remediate groundwater impacts from historic fill material (other than submitting a CEA proposal to NJDEP). I can see the benefit of surface water sampling at/adjacent to historic fill sites so that potential impacts are known by the NJDEP, but I don't see how much more than that can be done without also changing the NJDEP's existing policy on how groundwater impacts from historic fill are addressed. The guidance should either include a statement that it does not apply to historic fill impacts, or at a minimum limit investigation/remediation of historic fill impacts to sampling of surface water and reporting the results to NJDEP.	The issue of historic fill impacts to surface water is beyond the scope of this guidance document.
4			Executive Summary	General Comment: Overall the document read more as a resource than a technical guidance due to the lack of procedures and minimum standards, such as guidance for minimum number of samples, requirements for testing of aquatic life parameters etc. Concern is that significant variability among practitioners and confusion will result.	The document provides tools for identifying the location of contaminated ground water discharge areas. The number of samples will unfortunately vary depending on many factors. It is left to the investigator's professional judgement to determine when characterization of an area is complete.

NJDEP Technical Guidance Document: Response to Comments

Document "Characterization of Contaminated Ground Water Discharge to Surface Water Techincal Guidance"

Comment Period: June 9, 2015 to July 21, 2015

Committee Chairperson: Bill Hanrahan, NJDEP

Comment #	Page	Sect	Subsect	Comments	Response
5	4	3	1.1	In the second paragraph, it is suggested that the word "located "(as in "the discharge zone(s) must be located") be changed to "identified", and the term "must" (as in "so that surface water, sediment pore water, and sediment sampling must be biased") be changed to "can".	The suggested changed has been made
6	4	3.1	0.1	spell out GWTG…is there a gw tech guidance??	Abbreviations are listed on the abbreviations page at the beginning of the document. A GWTG exists and is available at http://www.nj.gov/dep/srp/guidance/
7	4	3.1	1	This section refers to both “discharge zone(s) and the “discharge area.” What are the definitions of these two phrases and how do they differ? Please clarify in the guidance.	The term has been standardized to "discharge zone" in the document. The discharge zone is the area in the surface water sediment bed where the ground water is discharging to the surface water body. It also refers to the area defined by the intersection of the ground water contaminant plume and the surface of the surface water sediment bed.
8	4	3.1	2	It is not clear why both sediment and sediment pore water “should also be sampled.” Reliable sampling of sediment pore water can be technically very challenging and as section 3.1.3 notes, no investigation is required if applicable surface water standards are not exceeded. Ongoing monitoring of surface water could be appropriate if there is a possibility that conditions will worsen or if concentrations in proximate groundwater are significantly (order of magnitude) above the surface water standards.	The Department's EETG recommends sampling of pore water to measure site specific bioavailability (6.2.2.3 of the EETG). The sentence has been revised to state "…in addition sediment and sediment pore water samples are collected to assess risk to benthic community in accordance with the Department’s EETG" However, the tools utilized in performing the investigation of ground water discharges to surface water are to the professional judgement or the investigator.
9	4	3.1	3	The commenter is not aware of any Remediation Standards or Ecological Screening Criteria for sediment pore water. Nor is the commenter aware of any Remediation Standards established for sediment. Please clarify the language of this paragraph.	The EETG provides methods for evaluating the results of sediment pore water analyses. In addition, the GWRS and/or SWRS may be applicable to sediment pore water. The sentence has been re-worded as follows: "Sample results are compared to the applicable Remediation Standard (N.J.A.C. 7:26D-1 et seq.) and are evaluated using the EETG. Where standards or criteria are exceeded, a remedial investigation of surface water or ecological receptors is required in accordance with the TRSR. ."
10	4	3.1	3.1	When ground water contamination above the Surface Water Quality Standards is identified close to surface water, This is very vague. Do you mean when a constituent in ground water is found in concentrations that would exceed the applicable surface water quality standard? And how do you define "close to surface water"? How is it defined/measured? E.g., Within so many inches/feet of the water table? Should specify here or refer to Section 6.	The sentence has been re-worded as follows: "When there is the potential that ground water contaminated above the Surface Water Quality Standards may discharge to surface water, the contaminated ground water to surface water discharge zone should be characterized, and a Site Investigation (SI) of surface water and ecological receptors is required...".
11	4	3.1	3.12	Consider this revision: "After the contaminated ground water discharge zone has been located, surface water sample must collected from the area to assess potential surface water impacts (to assess risk to water column receptors), sediment and sediment pore water samples should also be sampled (to assess risk to benthic community).	The sentence has been re-worded as follows: "After the contaminated ground water discharge zone has been located, surface water samples are collected from the area to assess potential surface water impacts, to compare to SWQS and assess risk to water column receptors. The EETG should be consulted for characterization of sediment and sediment pore water to assess risk to the benthic community.
12	4	3.1		This section indicates that an evaluation of surface water and ecological receptors should be performed if groundwater concentrations above the Surface Water Quality Standards are detected close to surface water. However, it should be clarified that an ecological evaluation would only be triggered if standards based on protection of aquatic life relevant to the receiving water body are exceeded.	The section indicates "applicable Remediation Standard" in the case where an ecological investigation is required, the applicable standards are the aquatic standards in the SWQS.

NJDEP Technical Guidance Document: Response to Comments

Document "Characterization of Contaminated Ground Water Discharge to Surface Water Techincal Guidance"

Comment Period: June 9, 2015 to July 21, 2015

Committee Chairperson: Bill Hanrahan, NJDEP

Comment #	Page	Sect	Subsect	Comments	Response
13	4	3.1		This section indicates that a user of the guidance should develop a conceptual site model any time "groundwater concentrations above the Surface Water Quality Standard is identified close to surface water". It would be helpful to have a better definition for what is meant by "close to surface water." Guidance on using travel time calculations or 2-D groundwater flow models that incorporate conservative degradation constants; or even a policy statement that surface water standards only apply within a certain distance would be examples of how this zone could be established.	The sentence has been re-worded to indicate that when there is the potential that ground water contamination may discharge to surface water an investigation is required. In addition the following has been added: A conceptual model should be developed to assist in determining if there is a potential that ground water contamination is discharging to surface water, the following should be considered: • The distance from the known location of ground water contamination to the surface water body. • The velocity and direction of ground water and contaminant flow. • The estimated length of time that ground water contamination has been migrating; and • Preferential flow paths. A conceptual model that incorporates physical, hydraulic, and chemical aspects of the system should be developed to support a decision regarding the potential for ground water contamination to impact surface water. In addition, the conceptual model will support a sound field investigation approach. Guidance on conceptual models can be found in the Department's "Technical Guidance for the Preparation and Submission of a Conceptual Site Model" and the "Ground Water Technical Guidance: Site Investigation; Remedial Investigation; and Remedial Action Performance Monitoring".
14	5	3	3.1.3	Insert "of surface water and sediment" after "remedial investigation" to limit impact of statement that "no remedial investigation is required."	The statement has been clarified.
15	5	3	3.1.3	Is the referenced monitoring to be done prior to the RAO or after pursuant to a remedial actin permit?	Monitoring may occur during any phase of the remediation.
16	5	3.1	3	What is meant by "ecological samples"? We are not aware of standards or criteria for "ecological samples." Also, this section indicates that "monitoring should continue until there is no longer the potential for ground water contamination to impact surface waters." Additional information should be provided about how to determine when this criterion is met. The guidance already indicates that the worst case scenario be evaluated. If this scenario is evaluated and it is found that there are no unacceptable impacts, then further monitoring is not likely to be necessary.	The term "ecological samples" pertains to samples collected in areas such as wetlands and surface waters or sediments as opposed to areas where human exposure scenarios prevail and that are governed by the Department's Remediation Standards. The EETG provides methods to evaluate ecological samples (sediment, pore water and surface water). Additional monitoring of the pathway may be necessary if the ground water contaminant plume is still migrating toward surface water or if higher concentrations of the ground water plume have yet to reach the surface water. In addition, the decision to terminate surface water monitoring is ultimately a matter of professional judgement by the LSRP in non-traditional oversight cases.
17	6	4		It should be pointed out in the guidance (possibly here in Section 4.0) that discharge might not be uniform over the discharge area or may be happening in localized discrete discharge points that will be difficult to map. However, it should also be noted that it likely is not necessary to map every discharge location if there are no unacceptable impacts to surface water in the vicinity of discharge and downstream.	The guidance attempts to make this point by referencing the Conant paper in section 4. The amount of detail that is required to characterize the ground water discharge zones is left to the professional judgement of the investigator.

NJDEP Technical Guidance Document: Response to Comments

Document "Characterization of Contaminated Ground Water Discharge to Surface Water Techincal Guidance"

Comment Period: June 9, 2015 to July 21, 2015

Committee Chairperson: Bill Hanrahan, NJDEP

Comment #	Page	Sect	Subsect	Comments	Response
18	6	4		The bullet describing “High Discharge” states that areas of high hydraulic conductivity are areas of high discharge. However, this should also state that there also needs to be a head gradient going towards the surface water body and high enough to lead to high discharge (a high hydraulic conductivity with very low head could have similar discharge to a moderate conductivity with very high gradient).	The reader is directed to Conant 2004 for more information. The committee did not feel that it was necessary to re-iterate the entire paper in the guidance.
19	6	4		1st paragraph, bulleted list reference to the NJGS hydro database for hydraulic conductivity. That summary tries to tie values to formations, which are seldom texturally uniform and in many instances are based on a single measurement. There are on-line references that might be more useful for estimating the hydraulic properties of site soils. For example: http://web.ead.anl.gov/resrad/datacoll/conuct.htm	The Investigator may use any reference in an initial conceptual hydrostratigraphic model. In the end, N.J.A.C. 7:26E-4.3(a)2 requires characterization of hydrogeology of the site which would entail collecting site specific measurements of hydraulic conductivity.
20	7	4.1	4.1	Where surface water elevations are greater than nearby ground water elevations and surface water recharges ground water (a losing stream). something missing in this sentence. Perhaps change to "Where surface water elevations are greater than nearby ground water elevations, the surface water flows to (recharges) the ground water (a losing stream)."	The sentence has been clarified as follows: "Streams where surface water elevations are greater than ground water elevations and surface water recharges ground water are known as losing streams".
21	11	1	1.1	Maybe point out it looking a hydraulic heads at multiple depths to determine vertical gradient near stream maybe helpful, since comparing water table wells with sw elevation may be inconclusive without longer term monitoring	The suggestion has been added to the guidance
22	11	5	1	end first sentence with ".. at the time of investigation." Since conclusion may be different at other times.	The sentence has been clarified.
23	11	5.1	1	Second paragraph. What would make this necessary? Does this mean that if the Darcy based calculation indicates there is no unacceptable discharge, then more detailed analysis is not necessary? Please provide additional language in the guidance.	The hydraulic calculations are one part of the development of the conceptual model. They enable an understanding of contaminant migration and flux to surface water. The investigator should use professional judgement to determine if additional more detailed analysis is necessary depending on the complexity of the site.

NJDEP Technical Guidance Document: Response to Comments

Document "Characterization of Contaminated Ground Water Discharge to Surface Water Techincal Guidance"

Comment Period: June 9, 2015 to July 21, 2015

Committee Chairperson: Bill Hanrahan, NJDEP

Comment #	Page	Sect	Subsect	Comments	Response
24	12	5.1	5.1.3	2nd sentence: Note that "discharge" is used to refer to an area-specific discharge and the term "flux" should be substituted. In order to avoid any misinterpretation, it might be noted that the location where the greatest flux occurs is not necessarily where the contaminant will discharge. There is no mention in the text that deeper flow lines will generally discharge further from the bank or shoreline and that contamination therein (either from a distant spill or a DNAPL source might be advected near the bottom of the aquifer and discharge near the middle of a stream. Also, the statement in the next sentence about seepage occurring in area with "higher permeability," should probably say "less hydraulic resistance." This would then include areas where the silt mantle is thinner, but not necessarily more permeable.	Fetter (1988) Applied Hydrogeology defines the term "discharge" as "the volume of water flowing in a stream of through an aquifer past a specific point in a given period of time". The sentence is referring to a place in the stream bed where the volume of water passing a specific point in a given period of time is the greatest. The use of the term "discharge" for this purpose is acceptable and understandable. This paragraph is a general discussion of ground water discharge location in surface water based on sediment conductivity and was not modified to include a discussion of contaminant discharge area. Tools and methods for finding the location of the contaminated ground water discharge zone are provided in the next section of the document.
25	12	5.2	5.2	A model result due to dilution will not substitute for the determination of compliance with the remediation standards - surface water (human health and aquatic health criteria) as identified in the Department's Attainment Guidance. . Should this say "compliance with the remediation standards or the surface water quality standards, ..." and what is the "Department's Attainment Guidance? If it only applies to remediation stds, the sentence needs to be revised accordingly	The sentence has been clarified to read "A model may not be used to determine compliance with N.J.A.C. 7:26D, the Department's Remediation Standards, or ecological criteria".
26	12	5.2	na	Consider this revision "The investigation must show that the model assumptions and predicted outcomes are representative of actual site conditions and groundwater -surface water interactions via the collection of surface water, sediment, and porewater samples to ground truth the model results.	The paragraph has been clarified to make it clear that models may not be used to demonstrated attainment with the remediation standards or criteria.
27	12	5.2	na	Consider this revision "The investigation must show that the model assumptions and predicted outcomes are representative of actual site conditions and groundwater -surface water interactions via the collection of surface water, sediment, and porewater samples to ground truth the model results.	The paragraph has been clarified to make it clear that models may not be used to demonstrated attainment with the remediation standards or criteria.
28	13	5	3	Biologically Active Zone should be 15 cm, not 10 cm, to be consistent with the NJDEP EETG, Section 6.2.2.1(II)A, which defines the BAZ as 0"-6" (i.e. 15 cm)	The sentence has been modified to indicate that the biologically active zone extends 0-6 inches beneath the sediment surface.

NJDEP Technical Guidance Document: Response to Comments

Document "Characterization of Contaminated Ground Water Discharge to Surface Water Techincal Guidance"

Comment Period: June 9, 2015 to July 21, 2015

Committee Chairperson: Bill Hanrahan, NJDEP

Comment #	Page	Sect	Subsect	Comments	Response
29	13	5.2	5.2	Second paragraph: This paragraph should be reworded (not necessarily as below). Both analytical and numerical models use mathematical equations. The difference between analytical and numerical models are the following: Analytical models are simpler, makes assumptions such as constant conductivity, uniform aquifer thickness, flat water table and fully penetrating streams; whereas, numerical models are more complex and may include complex geometry and geology, multiple layered aquifers, boundary conditions, partially penetrating streams, loss factors such as evapotranspiration or irrigation, impacts from canals etc. In addition to this, a model can be physical, electrical analog or mathematical. The latter (mathematical) models may be deterministic, statistical or some combination of the two. When the ground-water flow equation is simplified further to form a subset of general equation, the set of equations and solutions (e.g. Theis curve) are referred to as analytical models.When these simplified models cannot represnt the physics of the site/situation, the partial differential equations may be approximated numerically using different techniques (e.g. finite differene or finite-elemet methods) resulting in grid based finite number of algebraic equations which defines hydraulic head and water quality at specific points. The system of algebraic equations are generally solved using matrix techniques. This approach, which is very complex and mostly needs computer programs, constitutes a numerical model. Moreover, a numerical model may be 1,2,3 or semi three dimensional. They may be continuous radial models or prismatic dicretized models as well.	The paragraph is giving the briefest of explanations for analytical and numerical models. This guidance is not intended to be modeling guidance and therefore, the paragraph was not modified.
30	13	5.2		2nd paragraph. It should be noted that there are analytical models that cannot be easily handled with a spreadsheet or a calculator, especially those that require an interative solution. There are also hydrid models that superimpose analytical solutions on numerical simulations. The main difference is that a numerical model employs spatitial and sometimes temporal discretization, which is what allows incorporating hydraulic heterogeneities and complex boundary conditions.	This guidance is not intended to be exhaustive in regard to modeling of ground water surface water interaction. The details of model selection and operation are left to a qualified individual.
31	13	5.3	5.3	The transformation of ground water plume contaminants as they migrate between the aquifer and surface water environments have not been studied at great length because they are difficult to observe and measure. I am not an expert in this subject but there are many journal publications on "migration of plume between aquifer and surface water". So, the statement should be considered for rewording (e.g. http://epa.gov/tio/download/remed/gwsw/gwsw_part1.pdf). It may not be well-understood but this statement seems to be contradicting some of the information provided on page 18.	The sentence has been deleted as there was no research performed to support its inclusion.
32	13	5.3		Text following the 3rd bullet. It would help to have some transition zone examples. In addition to the list of processes, this might be a good place to introduce bio-accumulation of contaminants, which becomes important in Section 7.	Section 6.1.3.2 of the Department's EETG provides comprehensive discussion of bioaccumulation.

NJDEP Technical Guidance Document: Response to Comments

Document "Characterization of Contaminated Ground Water Discharge to Surface Water Techincal Guidance"

Comment Period: June 9, 2015 to July 21, 2015

Committee Chairperson: Bill Hanrahan, NJDEP

Comment #	Page	Sect	Subsect	Comments	Response
33	15	5	4	Removing free "and residual" product will reduce mass loading. Section is on NAPL seeps, so if you have a NAPL seep, not all of the free product was removed. Maybe rewrite sentence.	The paragraph has been re-worded to indicate that investigation and remediation of sediment is required where there is the concern that NAPL may have migrated to the water body.
34	16	5	4	The continued release of NAPL at the may occur in the form of NAPL seeps. Needs to be fixed	The sentence has been re-worded as follows: "In this case, the continued release of NAPL may occur in the form of NAPL seeps."
35	18-20	6.1		Section 6.1 provides a reasonable overview of methods that can help highlight the locations of groundwater discharge zones. However, some methods are primarily qualitative, while others integrate spatial and temporal variability in a highly quantitative way. Section 3.1.1 makes it clear that the expectation is that contamination in seepage water will be delineated, and sampling "biased to the area that is most contaminated". The location of the seepage zone is a central issue to a technically defensible sampling strategy. It would be helpful if NJDEP provided some guiding principles when a qualitative method, such as visual inspections, will be considered sufficient to establish the discharge location, or at least triggers for when quantitative methods such as distributed temperature sensing would be necessary. Otherwise, the majority of investigations would likely rely on visual surveys that would have limited ability to resolve the central question in Section 3.1.1.	The comment is acknowledged, and appreciated. Each site is different and professional judgement is required in all cases involving potential discharges to surface waters to determine the level of technical effort required to complete an investigation. A variety of factors, as outlined in the Guidance, should be evaluated by the investigator in determining what level of effort is warranted. In particular, the magnitude, toxicity, and mobility of the contamination; site soils and hydrogeological conditions; and, existing and historical discharges and conveyances should guide the investigator in selecting an appropriate technology. Qualitative methods such as visual inspections to identify obviously indications of discharges would be a minimum requirement. However, larger sites on large water bodies with significant contaminant plumes and discharge histories will require a more quantified approach. The use of technically complex equipment, such as long temperature sensing arrays may be warranted and ultimately more efficient since they may more accurately define the discharge zone(s) or the lack of one, and allow for the focusing of the investigation and remedial actions.
36	18	6.1	1	This section indicates that review of remote sensing imagery may "reveal locations of potential ground water discharge zones." If possible, it would be helpful to provide more guidance or a reference to other documents here about how to actually use remote sensing data to identify discharge zones. The link to the infrared example is helpful, but more information on how the other types of remote sensing can reveal discharge zones would improve the usefulness of the guidance.	The section has been updated as follows: "Examples of evaluating ground water discharge to surface water using remote sensing may be found in (Becker 2006). " This paper has been added to the reference section also.
37	18	6.1	2	A discussion of the potential for bank storage and then release due to changes in surface water elevations (for example when changing from high tide to low tide in tidal situations) here would be helpful as these observable seeps might not indicate groundwater plume discharge, but rather surface water that has been temporarily stored in the bank substrate.	The following sentence has been added to 6.1.2: "Visual inspections should be performed during low flow conditions after several days without precipitation and during low tide conditions (where the water body is tidal)."
38	18	6.1	6.1.2	2nd paragraph, 1st sentence needs grammatical fixing. It also re-defines "seepage face," which is unnecessary and should be avoided to prevent confusion.	The sentence has been re-worded as follows "Seepage faces, broad areas of saturated soil below the ordinary high-water line, may be evident during low water periods".

NJDEP Technical Guidance Document: Response to Comments

Document "Characterization of Contaminated Ground Water Discharge to Surface Water Techincal Guidance"

Comment Period: June 9, 2015 to July 21, 2015

Committee Chairperson: Bill Hanrahan, NJDEP

Comment #	Page	Sect	Subsect	Comments	Response
39	19	6.1	2	This mentions the presence of sheens as a possible indicator of groundwater discharge. The discussion of sheens should be expanded to describe the difference between an oily sheen and a natural biological sheen caused by metal reducing bacteria. Description of the "stick test" as a method of distinguishing between these two types of sheens would be helpful, as they might not both indicate a groundwater discharge.	Providing guidance on distinguishing types of sheens is beyond the scope of this document.
40	20	6	2	Fist sentence "should" instead of "may"	The suggested changed has been made.
41	20	6.2	1	This section does not provide any substantive guidance on the frequency or density of sampling required to achieve delineation. Although professional judgment based on site-specific issues can and should be a major factor in the final study design, it would be helpful if the guidance included clarity about NJDEP's expectations. In addition, this section discusses delineating pore water to the SWQS but these standards were not established for application to pore water.	It is difficult to provide guidance on the density of sampling considering the variety of hydrologic and hydrogeological conditions across the state. The committee believes that this is a site specific issue and is best determined by professional judgement. It should be noted for example, that the EETG does provide suggested sampling frequencies for surface water bodies (Section 5). In addition, the this Guidance provides the user with multiple options ranging from desktop and background investigations, through conventional and more complicated sampling and analysis. A "weight-of-evidence" type approach may be appropriate in some cases to determine the potential for surface water impacts, and the investigator should rely on no single method, especially in more complex situations. A reasonable weight of evidence approach could include a thorough combination of historical site document/operational history review(including aerial photography), field inspections during high and low water periods (perhaps augmented by geophysics to identify buried conveyances/features), a ground water flow evaluation, and limited surface water sampling as suggested by the EETG. Pore water is ground water as defined in the Department's Ground Water Quality Standards which state: *"Ground water" means that portion of water beneath the land surface that is within the saturated zone".* In the case where that ground water/pore water discharges to surface water, the SWQS are applicable to that ground water in accordance with 7:9C-1.2(b), which states: *"7:9C-1.2(b) Discharges to ground water that subsequently discharge into surface waters shall not be permitted by the applicable regulatory program if such discharges would cause a contravention of surface water quality standards applicable to those surface waters. That is, those discharges must achieve compliance with both these standards and the surface water quality standards (N.J.A.C. 7:9B)."* In addition, pore water is also evaluated using methods outlined in the Department's EETG.
42	20	6.2	6.2.1	Please site a reference or provide some guidance on determining the number of pore-water samples based on the surface water body and on the size of the potential discharge area.	Unfortunately, the number of pore water samples is site specific depending on the size of the contaminated ground water discharge zone, heterogeneity of the sediment, the results of characterization samples etc.
43	22	6.4	na	Consider this revision: "Where there is a potential that off-site upstream contamination my be impacting the surface water body, surface water samples should be collected upstream of the delineated groundwater contaminant discharge and beyond the influence of other discharges related to the site."	The sentence has been re-worded as suggested.

NJDEP Technical Guidance Document: Response to Comments

Document "Characterization of Contaminated Ground Water Discharge to Surface Water Techincal Guidance"

Comment Period: June 9, 2015 to July 21, 2015

Committee Chairperson: Bill Hanrahan, NJDEP

Comment #	Page	Sect	Subsect	Comments	Response
44	23	7.1	na	Ground water mitigation options on the surface water side or in the transition zone include the following: amendments….treatment of GW plume. Consider adding the ITRC Contaminated Sediment - Remediation document as reference. The Capping Chapter covers this subject extensively. http://www.itrcweb.org/contseds_remedy-selection/ as well as the Section 3.3.4.2 of the NDEP Capping Guidance Document. 257.27.2.1Consider adding: It is essentail to ensure that pre-remedial baseline conditions are characterized using the same type of sampling devices and methodologies planned to be used for post-remedial monitoring to verify remedy effectiveness.	The listed options are intended as a guide for cleaning up a ground water plume on the land side… not for the remediation of sediments by sediment capping.
45	24	7	1.3	Additional information should be added in this section cautioning against hydraulic control altering or impacting wetlands	The sentence has been re-worded as follows: "Ground water pumping and treatment may provide an effective way to mitigate discharges, but may impact a receptor by reducing recharge from ground water and should be used with caution."
46	24	7.1	4	This section excludes MNA when “an impact” has been confirmed, but does not define an impact. Some measure of materiality is required.	The sentence has been reworded as follows: Monitored natural attenuation (MNA) strategies as a sole remedy for a ground water contaminant plume that is causing surface water or an ESNR to be contaminated above standards or criteria may not be appropriate.
47		7		The acronym ESNR (Environmentally Sensitive Natural Resource) is used extensively throughout this section but appears to lack a definition. Clarification is necessary to avoid varying interpretations.	The following has been added to the abbreviations list: "ESNR Environmentally Sensitive Natural Resource as defined in N.J.A.C. 7:1E-1.8".
48	25-27	7.2		While the list of factors identified is reasonable, not all are applicable in all cases, and “worst case” monitoring may suffice, rather than seeking to capture all variations.	The section indicates considerations for performance monitoring. The exact details of the monitoring program are left to the professional judgement of the investigator.
49	26	7.2	7.2.1.1	4th paragraph, 2nd sentence. This relates the need for extra sampling events to address extreme weather events. Elsewhere, it is implied that sample collection should be carefully planned to eliminate as many external biases (e.g. different parts of the tide cycle, after storms, etc.).	Initial samples are collected from ground water discharge zones. These zones are determined in the field using the tools and methods outlined in the document. This paragraph suggests that the location GW discharge zone may change after an extreme weather event. Hydrologic conditions at a water body may change after an extreme weather event. If an extreme weather event changes the location of ground water discharge zones, then the location of sampling in the long term monitoring program needs to change. The samples should still be collected during base flow conditions. When an extreme weather event occurs, the investigator should re-examine the monitoring program to determine if contaminated ground water discharge areas have changed due to re-arrangement of the bed of the water body.
50	27	7	3	ecological risk-based criteria should be ecological risk-based remediation goal in accordance with the EETG, Section 7.0 and 7:26E-4.8(c)	The sentence has been re-worded as suggested.

NJDEP Technical Guidance Document: Response to Comments

Document "Characterization of Contaminated Ground Water Discharge to Surface Water Techincal Guidance"

Comment Period: June 9, 2015 to July 21, 2015

Committee Chairperson: Bill Hanrahan, NJDEP

Comment #	Page	Sect	Subsect	Comments	Response
51	27	7.3		1st bulletted list. Consider adding surface water elevation.	The sentence has been re-worded as suggested.
52	28	7.3	7.3	If the site's risk is due to direct consumption of contaminated sediments by ecological receptors or food web interactions, tissue sampling will also be needed" Should refer to Office of Science for fish tissue sampling requirements and to the Bureau Marine Water Monitoring for shellfish monitoring requirements.	The guidance is offering the bulleted items as typical things to monitor. It is up to the practitioner to determine the exact requirements for their site.
53	29	7	7.3	Comment on bullet that reads: "Monitoring should be continued until compliance with the Remedaiton Standards has been attained." The remedial action permit will control how long the monitoring needs to continue.	Monitoring will be performed under a remedial action permit. Generally, monitoring would continue until the Remediation Standard is attained.
54	29	7.3	7.3	There is no discussion on the spatial extent (how far from the remediation site) for the monitoring or how it should be determined e.g. location determined by modeling where the contaminant plume in the ground water enters the surface water or should it be throughout the plume etc).	It is expected that the contaminated ground water discharge zone is characterized at this point in the project. Ground water, pore water and surface water monitoring locations are selected based on that characterization.
55	29	7.3		Biota sampling may not be necessary or appropriate to monitor recovery. Other methods may be more appropriate in some cases, for example where tissue levels may be elevated due to regional conditions.	Where regional or off-site sources of contamination are identified, no additional remediation for that part of the contamination caused by off-site sources is required.
56	35	Table 1		3rd contingency: contamination in ground water and pore water. The required action includes delineating the "surface water impact zone." Was something else intended here?	The sentence has been clarified to read "Delineate ground water discharge zone(s) and the extent of surface water contamination"
57	35	Table 1		4th contingency: contamination in all three media. The recommended action includes determining the horizontal and and vertical extent of impacts in the water column. One would expect the concentrations in the water column to vary greatly with relatively ordinary changes in stream discharge, and associated dilution, during baseflow recession. This will affect the lateral and vertical extent unless it is corrected to some baseline dilution. Can you provide some reference or give guidance with respect to selecting a reference flow rate and correcting measurements for the amount of dilution that would occur during the reference discharge, so that sequential samples can be compared to show the actual attenuation trends.	The guidance recommends sampling during base flow or low flow conditions and to bias sample collection to the worst areas of the contaminated ground water discharge zone. It is expected that this recommendation will be sufficient to determine if there is an impact to a surface water body from contaminated ground water. As remediation progresses, the investigator may wish to develop a more detailed monitoring program.
58		Table	1	First occurrence of "transect sampling" - maybe say what is meant or point to a document such as the eco guidance.	The sentence has been modified as follows: "...by sampling at multiple locations and depths along a transect. "
59		Table	2	Table 2 does not appear to be cited in the text. It needs to be cited in the text. The font size of the contents of Table 2 need to be increased to be legible.	A reference to Table 2 has been added to section 6.0 of the document.

NJDEP Technical Guidance Document: Response to Comments

Document "Characterization of Contaminated Ground Water Discharge to Surface Water Techincal Guidance"

Comment Period: June 9, 2015 to July 21, 2015

Committee Chairperson: Bill Hanrahan, NJDEP

Comment #	Page	Sect	Subsect	Comments	Response
60		Appendix	A	Maybe better explain purpose of this appendix. Is it is a way to explain why you have elevated pore water concentration but little in surface water or can it be used to predict when you should expect to see highest/worst case concnetrations in surface water? If so, put in main body of guidance otherwise delete.	The appendix provides examples of models that may be useful in determining if an impact to surface water is likely. It is stated that empirical data are required.
61	Appx D	Appendix D		3rd sentence: The use of the term "must" in the sentence implies there is a regulatory requirement. If so, provide a regulatory citation. If not, use the term "should".	In this case, the term "must" is used as a way to inform the investigator that if they wish to capture data representative of ground water discharges the conductivity probes must be kept in contact with the bottom of the surface water body. It is not related to any regulatory requirement but is a technical issue.