



Historic Fill Material and Diffuse Anthropogenic Pollutants Technical Guidance





Historic Fill Committee Members

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Introduction and Background

In 1993 the Legislature directed DEP to

- Develop procedures to demonstrate the presence of historic fill material, and
- Establish remediation requirements
 - To prevent exposure
 - To allow for the continued use of the property
 - That are less costly than removal or treatment, and
 - Are protective of human health and the environment

DEP adopted procedures for historic fill material in the Technical Rules

- Still in effect today





Introduction and Background

- Technical Rules allow the remediating party to either
 - **Sample** the fill for typical contaminants, or
 - **Assume** that the fill was contaminated
- Institutional (Deed Notice) and engineering controls (Cap) are the “standard” for historic fill material
- The list of contaminants/concentrations from Table 4-2 can be provided on the Deed Notice for the site





Historic Fill Table - N.J.A.C. 7:26E-4.6

TABLE 4-2

**Summary of Target Contaminant Concentrations in Typical
Historic Fill Material**

Contaminant (ppm)	Maximum	Average
Benzo(a)anthracene	160	1.37
Benzo(a)pyrene	120	1.89
Benzo(b)fluoranthene	110	1.91
Benzo(k)fluoranthene	93	1.79
Indeno(1,2,3-cd)pyrene	67	1.41
Dibenz(a,h)anthracene	25	1.24
Arsenic	1098	13.15
Beryllium	80	1.23
Cadmium	510	11.15
Lead	10700	574
Zinc	10900	575

Note: Table 4-2 was deleted from from proposed Technical Rules





Intended Use of the Guidance Document

Now until May 2012

- Technical Rule requirements for landfills and historic fill material are together
 - SI req. for historic fill material - N.J.A.C. 7:26E 3.12(b)
 - RI req. for historic fill material - N.J.A.C. 7:26E- 4.6(b)

After May 2012

- Technical Rule requirements for landfills and historic fill material will be separated
 - SI req. for historic fill material - N.J.A.C. 7:26E 3.13
 - RI req. for historic fill material - N.J.A.C. 7:26E- 4.7





Intended Use of the Guidance Document

After May 2012 - Rules

- Less detailed requirements for historic fill material
- Addresses Diffuse Anthropogenic Pollutants (DAP) for the first time

After May 2012 - Guidance

- Recommended procedures for the investigation and remediation of historic fill material and associated ground water contamination
- Recommended procedures for the investigation and remediation of and DAP





Intended Use of the Guidance Document

Now until May 2012

- Use of this guidance is a **variance** from the rule from the rules
- Variances must be indicated as such in submitted forms and reports
- The use of professional judgment to “**deviate**” from this guidance document must be identified as such in submitted forms and reports





Definition of Historic fill material

What it is

- Non-indigenous material, deposited to raise the topographic elevation of the site
- Was contaminated prior to emplacement
- Is in no way connected with the operations at the location of emplacement
- Includes construction debris, dredge spoils, incinerator residue, demolition debris, fly ash, or non-hazardous solid waste





Definition of Historic Fill material

What it isn't

- Any material which is substantially chromate chemical production waste
- Chemical production waste
- Waste from processing of metal or mineral ores, residues, slag or tailings
- A municipal solid waste landfill site





Definition of diffuse anthropogenic pollution* (DAP)

- Broadly distributed contaminants, often arising from multiple sources, which have been historically generated by human activities
- Generally from atmospheric deposition, but may contain contributions from random, non-point sources that are **not attributed to a discharge at the site**
- Typically contains PAHs and metals above health-based soil remediation standards

*defined in proposed Technical Rule





Preliminary Assessment

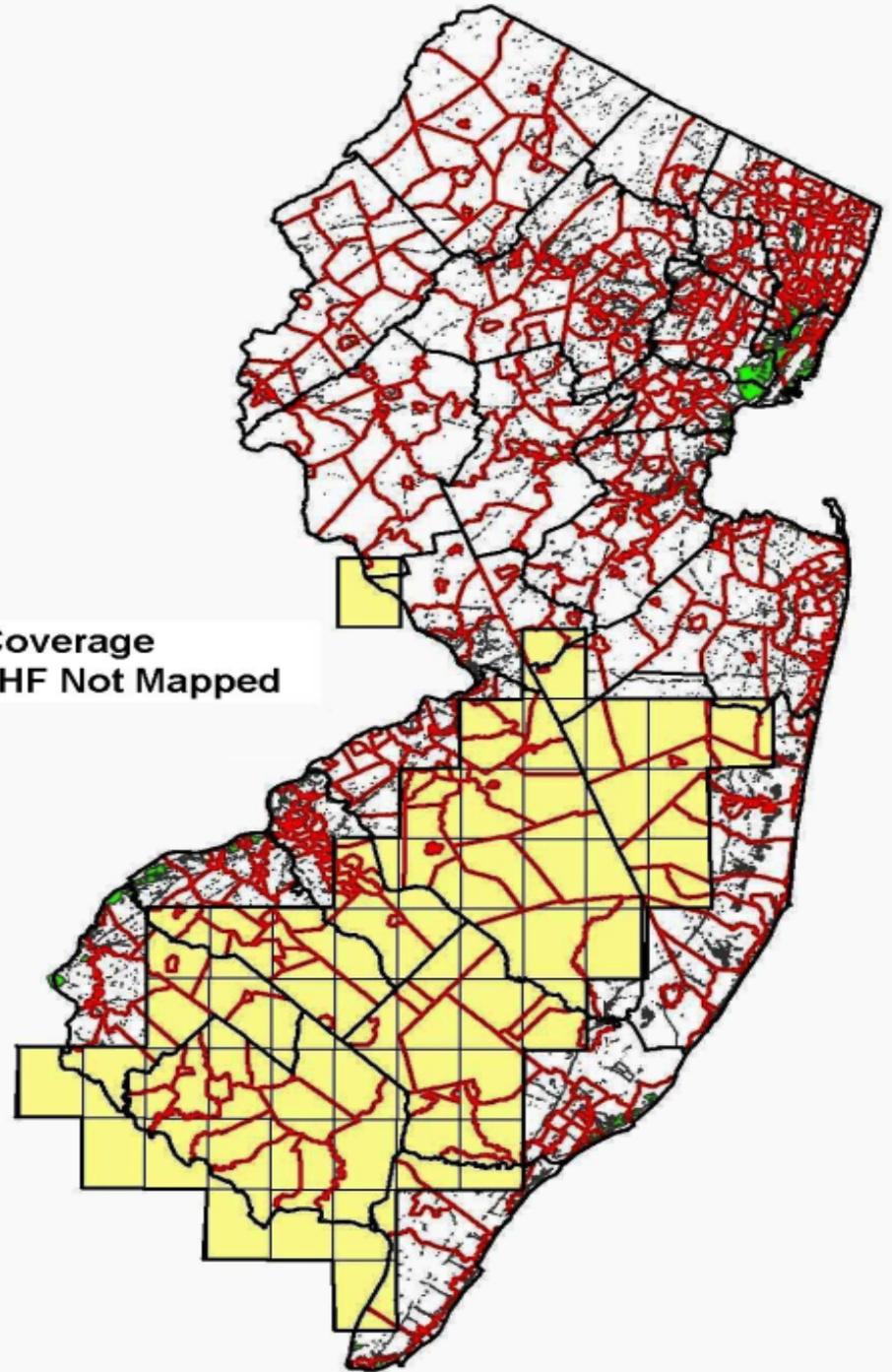
- Evaluate the presence of historic fill material as part of the PA (if a PA for the site is required)
- If a PA for the site is not required, evaluate the presence of historic fill material as part of the SI
- Evaluate by reviewing available historical site records, maps and aerial photographs
- Should include review of the NJGS historical fill maps available for much of New Jersey at

www.nj.gov/dep/njgs/geodata/dgs04-7.htm





NJGS Historic Fill Mapped Coverage
Note Yellow Boxes Indicate HF Not Mapped





www.nj.gov/dep/njgs/geodata/dgs04-7.htm



Digital Geodata Series DGS04-7 Historic Fill For New Jersey As Of February 2009

[IMAGE](#)

[METADATA](#)

[DOWNLOAD](#)

Abstract

The "Brownfield and Contaminated Site Remediation Act" (N.J.S.A. 58:10B-1 et seq.) requires the Department of Environmental Protection to map regions of the state where large areas of historic fill exist and make this information available to the public. These maps show areas of historic fill covering more than approximately 5 acres. For the purposes of these maps, historic fill is non-indigenous material placed on a site in order to raise the topographic elevation of the site. No representation is made as to the composition of the fill or presence of contamination in the fill. Some areas mapped as fill may contain chemical-production waste or ore-processing waste that exclude them from the legislative definition of historic fill.

Fill was mapped from stereo aerial photography taken in March 1979, supplemented in places by planimetric aerial photography taken in the spring of 1991 and 1992. Additional areas of fill were mapped by comparing areas of swamp, marsh, and floodplain shown on archival topographic and geologic maps on file at the N. J. Geological Survey, dated between 1840 and 1910, to their modern extent. In a few places, fill was mapped from field observations and from drillers' logs of wells and borings.

Most urban and suburban areas are underlain by a discontinuous layer of excavated indigenous soil mixed with varying amounts of non-indigenous material. This material generally does not meet the definition of historic fill and is not depicted on these maps. Also, there may be historic fills that are not detectable on aerial photography or by archival map interpretation and so are not shown on these maps, particularly along streams in urban and suburban areas.

Use of the maps related to the Technical Rules, N.J.A.C. 7:26E. These maps are provided for informational purposes only. The use of these maps as the only source of information regarding the presence of historic fill at a site does not fulfill the diligent inquiry requirements of the Preliminary Assessment set forth at, N.J.A.C. 7:26E-3.1(c). These maps may be used as one source of information to fulfill the requirements of the Site Investigation at, N.J.A.C. 7:26E-3.12. **These maps are not intended to fulfill the Remedial Investigation requirements associated with historic fill at, N.J.A.C. 7:26E-4.6(b).**

At this time 121 USGS 7.5 minute quadrangles have been mapped for historic fill, mostly in urbanized and shoreline areas. These 121 maps were digitized to ESRI coverages. As of February 2009 the Plainfield quadrangle



New Jersey 7-1/2' Quadrangle Index Map Showing County Boundaries

Download a historic fill quadrangle coverage/shapefile, statewide coverage/shapefile or PDF maps by clicking a file link below.

New Jersey 7-1/2'
Quadrangle Index List

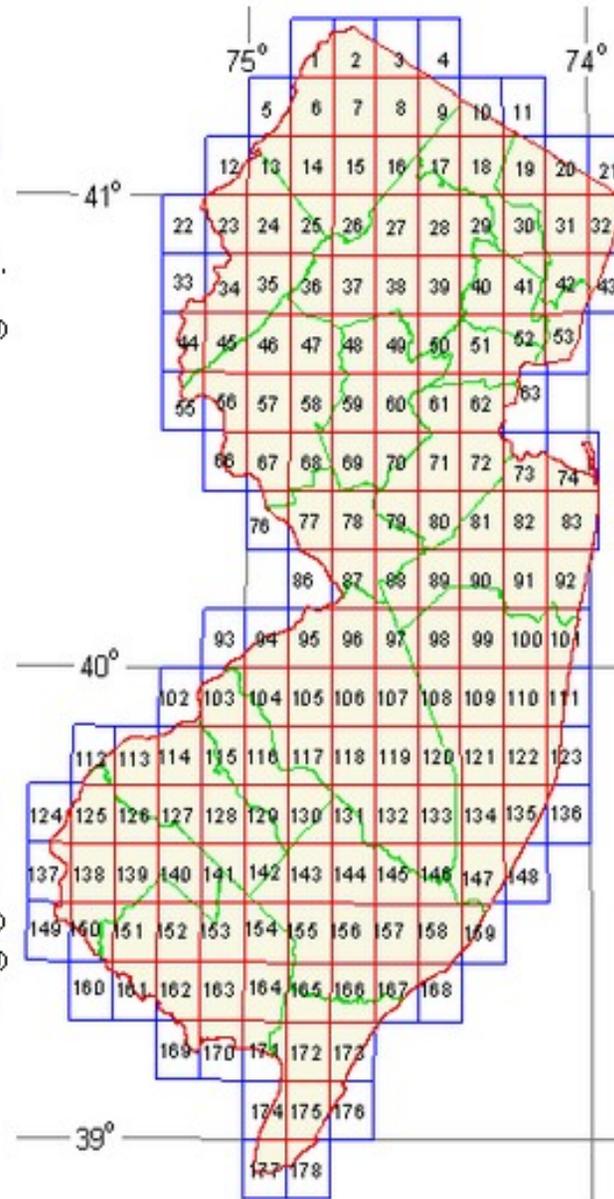
SAMPLE IMAGE

- 1 [Milford\(PA\).zip](#) (8KB), [PDF](#) (2MB)
- 2 [Port Jervis South\(NY\).zip](#) (13KB), [PDF](#) (3MB)
- 3 [Unionville\(NY\).zip](#) (13KB), [PDF](#) (1MB)
- 4 [Pinel Island\(NY\)-Wawayanda.zip](#) (30KB), [PDF](#) (1MB)
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New Jersey 7-1/2'
Quadrangle Index List

SAMPLE IMAGE

- 90 [Adelphia.zip](#) (65KB), [PDF](#) (5MB)
- 91 [Farmingdale.zip](#) (64KB), [PDF](#) (4MB)
- 92 [Asbury Park.zip](#) (69KB), [PDF](#) (5MB)
- 93 [Frankford-Beverly\(PA\).zip](#) (71KB), [PDF](#) (5MB)
- 94 [Beverly-Frankford\(PA\).zip](#) (71KB), [PDF](#) (5MB)
- 95 [Bristol\(PA\).zip](#) (103KB), [PDF](#) (3MB)
- 96 Columbus-Not Available
- 97 New Egypt-Not Available
- 98 Cassville-Not Available
- 99 Lakehurst-Not Available
- 100 Lakewood-Not Available
- 101 [Point Pleasant.zip](#) (50KB), [PDF](#) (3MB)
- 102 [Philadelphia\(PA\).zip](#) (18KB), [PDF](#) (1MB)
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- 106 Pemberton-Not Available
- 107 Browns Mills-Not Available
- 108 Whiting-Not Available
- 109 Keswick Grove-Not Available
- 110 [Toms River.zip](#) (120KB), [PDF](#) (5MB)



Zip file
(GIS) and
pdf formats
available



Jersey City Historic Fill Quadrangle (partial)





Preliminary Assessment

- LSRPs are exempted from calling the DEP Hotline when historic fill material is identified (N.J.S.A. 58:10C-16k)
- Historic fill material is listed as an area of concern in the Technical Rules
- Remediation of historic fill material is required pursuant to the Technical Rules
 - Remediation is initiated with the submission of a Confirmed Discharge Notification form to DEP
 - See handout on administrative process





Site Investigation - Important

- All other AOCs must be **identified and investigated independently** of historic fill material
- Other AOCs are often identified
 - During the PA/SI from a diligent inquiry of site history and origin historic fill material
 - By elevated PID/FID readings (5 X background)
 - Detection of any free and/or residual product
- Remediation of all other AOCs must be conducted pursuant to the Technical Rules





Site Investigation

Conduct a subsurface investigation to evaluate the nature and general extent of historic fill material

- Test pits, trenches or borings to a depth of two feet below the fill material to determine extent
 - Screen using field instruments (PID/FID)
 - Log results to document subsurface conditions including fill characteristics
- Document the depth to ground water and contamination if encountered
- Photo-documentation of historic fill material and subsurface stratigraphy is encouraged





Site Investigation – After Historic Fill Material is Identified

The investigator may either:

- **Assume** that the fill material is contaminated (exceeds the residential soil remediation standards), **and**
- Conduct a remedial investigation (N.J.A.C. 7:26E-4.6(b))

or

- **Collect samples** to document that the fill is clean (does not exceed the residential soil remediation standards)





Site Investigation – Sampling to Determine The Fill Is Clean*

- Select 2 sample locations per acre of historic fill material at a minimum (regardless of site size)
- If the material is homogeneous
 - Collect 1 discrete sample, per sample location, from a 6 inch interval in the historic fill material
- If the fill has defined strata (or layers of different fill material)
 - Collect 1 discrete sample from a 6 inch interval from each stratum in the historic fill material
 - Not recommending sampling from each strata/subsurface sample

*Note guidance differs from current Technical Rules





Site Investigation – Sampling to Determine The Fill Is Clean*

Analyze soil samples for

- PAHs – from the EPA Target Compound List (TCL)
- Metals – using the EPA Target Analyte List (TAL)
- Complete TCL/TAL analysis and EPH on 25% of samples (min of 1 sample, per stratum/fill type, per site)
- Use the DEP “Protocol for Addressing Extractable Petroleum Hydrocarbons”
 - Evaluate the results using **EPH Category 2**

*Note guidance differs from current Technical Rules





Site Investigation – Sampling to Determine The Fill Is Clean*

- No further investigation of the historic fill material is required when
 - Analytical results confirm that historic fill material does not exceed DEP residential soil remediation standards
 - Evaluation of the impact to ground water pathway is not required

or

- Conduct a remedial investigation when
 - Analytical results confirm contamination exceeding residential soil remediation standards





Remedial Investigation

PA identified historic fill through one or more of the following:

- Review of aerial photographs
- Historic fill maps
- Interviews with knowledgeable persons
- Historical sampling data
- Historical subsurface observations
- Information from neighboring properties





Developing Remedial Investigation

Items to Consider

- Lines of Evidence
- Are other AOCs present on site?
- Future Site Use
- Access
- Is historic fill site-wide or area-specific?





Site Wide Historic Fill - RI

- Determine horizontal and vertical extent on site for each fill type
- Delineation beyond the property boundary is not required
- Delineate site-specific AOCs independently
 - If contaminants of concern are the same, collect sufficient samples to determine concentration gradient
- Collect analytical data if not assuming that the fill is contaminated





Area Specific Historic Fill - RI

- Confirm the historic fill material is not a result of site-operations (e.g., process waste)
- If historic fill is **not site wide** it must be treated as a **separate AOC**
 - Fully delineate the horizontal and vertical extent
 - Confirm non-fill soil outside the extent of historic fill
 - Select analytical parameters if not using assuming the fill is contaminated based on the SI, or
 - Use the parameter list in the SI section of the guidance





Additional Considerations - RI

- Professional judgment may be used to deviate from Guidance
- Min of 4 borings/test pits/trenches per acre of historic fill
- Reduced frequency may be used for larger sites
- No fewer than 4 locations should be evaluated (regardless of size)
- The presence of ground water should be noted
- Determine if ground water is located within 2 feet of the base of the historic fill





Remedial Action - Requirements

If historic fill is assumed/confirmed to be contaminated above the applicable soil remediation standards

- Engineering and institutional controls are required
 - Existing site improvements may be used as a cap (if appropriate)
- Soil remediation permit is required
- Biennial certifications is required
- Financial Assurance (FA) is required





Remedial Action - Requirements

For a non-residential site - contamination between residential and non-residential SRS

- Deed Notice is required (engineering control is not required)
- Soil Remediation Permit is required
- Biennial Certifications are required
- Financial Assurance is not required.





Diffuse Anthropogenic Pollution - DAP

Generally DAP is identified during the RI based on lines of evidence

- SI analytical data not matching site related operations or historic fill
- AOC specific RI data indicates concentration gradients not indicative of a point source discharge
- Industrial history of site/region





Remedial Investigation - DAP

To evaluate for DAP in soil

- Rule out historic fill
- Collect sufficient soil samples to establish concentration gradients and to delineate any AOC specific discharges
- Off-site delineation of DAP is not required
- Ground water sampling related to DAP should be a site-specific decision and based on professional judgment





Remedial Action - DAP

- Similar to Historic Fill
- Remedial strategies must be based on current and future site use
- A cap may be appropriate based on concentration of contamination and exposure pathways
- Existing site improvements may be used as a cap (if appropriate)
- Soil remediation permit is required
- Biennial Certifications are required
- RFS will be required if engineering controls are used





Ground Water Requirements for Historic Fill Material

Site Investigation

- If fill material is not within 2 feet of the seasonal high water table - no further investigation
 - If fill material is within 2 feet of the seasonal high water table
 - Assume the ground water is contaminated and conduct the RI
- or
- Sample demonstrate ground water is below the applicable GW standard





Ground Water Requirements for Historic Fill Material

- If fill material is within 2 feet of the seasonal high water table
- and**
- The remediating party/LSRP chooses to sample
 - The sample must analyzed using USEPA TCL/TAL
 - Low flow sampling is recommend
 - Collect the sample within the fill area (if not possible, within 10 feet of fill area)





Ground Water Requirements for Historic Fill Material

If sampling confirms contamination

- In areas of regional historic fill material
 - Establish a Classification Exception Area (CEA) for the ground water contamination associated with the fill
 - This option is only available when no other ground water contamination is identified
- When the historic fill material is contained within the property boundary
 - Conduct an RI similar to any other AOC





Ground Water Requirements for Historic Fill Material

Establishing a CEA in areas of regional historic fill material

- Extent of the CEA – Based on property boundary
- Duration of the CEA – Is “indeterminate”
- Contaminants – List all contaminants above the applicable ground water remediation standards
- Submit the CEA Fact Sheet form and applicable attachments with the RI Report for the site





Ground Water Requirements for Historic Fill Material

Once the CEA is established

- A biennial certification is not required -
It's the Department's responsibility as a regional
issue
- A remedial action permit for ground water
is not required





Historic Fill Material General Case Studies

- I. Site within regional mapped historic fill material
- II. Site partially within regional mapped historic fill material
- III. Historic fill material located within site/property boundary





I. Site within regional mapped historic fill material





I. Site within regional mapped historic fill material

PA – Lines of evidence indicate entire site within area mapped as historic fill material

SI – Install test pits/trenches/borings within the suspected extent

– Document depth to ground water (if encountered, evaluate for contamination)

– Assume historic fill material and ground water are contaminated and proceed to RI

or

– Conduct sampling





I. Site within regional mapped historic fill material

- RI** – Characterize nature and delineate general extent of fill (4 borings/acre or professional discretion)
- Perimeter sampling not required
 - Analytical sampling not required
 - Sample ground water if fill is within 2' of water table (if not done in SI)
- RA** – Provide results and/or describe nature and extent of fill in Deed Notice
- Soil remediation permit
 - Install engineering controls
 - Establish CEA
 - Establish Financial Assurance





II. Site partially within regional mapped Historic Fill Material





II. Site partially within regional mapped Historic Fill Material

PA/SI – Similar to entire site mapped within HFM

RI – Delineation required including establishing perimeter and extent of HFM within the site.

- Sample ground water if HFM within 2' of water table (if not done during SI)

RA – Provide results and/or describe nature and extent of fill in Deed Notice

- Soil remediation permit
- Install engineering controls
- Establish CEA
- Establish Financial Assurance (FA)

Note - the delineation can be used to reduce the extent of an engineering control (if needed) and amount established for the FA





III. HFM mapped within site/property boundary





III. HFM mapped within site/property boundary

- PA** – Lines of evidence indicate probable HFM contained within the site.
- SI** – Confirm/refute presence of HFM. Investigate HFM as an AOC in RI.
- RI** – To characterize HFM, install at least four borings, test pits or trenches per acre with a minimum of four locations per site, regardless of size.
 - Establish horizontal extent of HFM by installing a minimum of four borings /test pits/trenches in non-fill areas.
 - If ground water sampling is required, conduct a remedial investigation of the ground water pursuant to the Tech Rules N.J.A.C. 7:26E-4.4.
- RA** – Provide results and/or describe nature of fill in Deed Notice, soil remediation permit, eng, controls and establish CEA and Financial Assurance if needed. The delineation can be used to reduce the extent of an engineering control (if needed) and amount established for the FA.





Questions?

