

MARCIA A. LECLERC
MAYOR

PURCHASING DEPARTMENT

TOWN OF EAST HARTFORD

740 Main Street
East Hartford, Connecticut 06108

(860) 291-7271

FAX (860) 282-4857

**TOWN OF EAST HARTFORD, CT
INVITATION TO BID**

BID #20-14

RE: R.F.P. – Landfill Engineering Services

Proposals will be received at the Office of the Purchasing Agent, Town Hall, 740 Main Street, East Hartford, Connecticut, 06108 until **11 A.M. ON Thursday, February 6, 2020** at which time they will be publicly opened and recorded.

Information and Specifications are available at the above office or on the Town of East Hartford bid's website at <http://www.easthartfordct.gov/bids>

The right is reserved to reject any or all bids when such action is deemed to be in the best interest of the Town of East Hartford, Connecticut

Michelle A. Enman
Purchasing Agent
(860) 291-7271

BID #20-14

**REQUEST FOR PROPOSALS (RFP) FOR PROVIDING
LANDFILL ENGINEERING SERVICES
TO THE TOWN OF EAST HARTFORD
PUBLIC WORKS ENGINEERING DIVISION**

**Issued by: Public Works Department
Engineering Division
Town of East Hartford
740 Main Street
East Hartford, CT 06108**

**Technical Contact: Douglas Wilson, P.E.
Town Engineer
(860) 291-7380**

**Proposal Due: 11 a.m., February 6, 2020
To the Purchasing Department**

**Michelle Enman
Purchasing Agent
Town of East Hartford
740 Main Street
East Hartford, CT 06108
(860) 291-7271**

**TOWN OF EAST HARTFORD
REQUEST FOR PROPOSALS (RFP) FOR PROVIDING
LANDFILL ENGINEERING SERVICES
TO THE TOWN OF EAST HARTFORD'S
PUBLIC WORKS ENGINEERING DIVISION**

1. Description and General Information:

The Town of East Hartford (the Town) is inviting Consulting firms to submit their firm's qualifications and rate schedule to provide engineering, environmental sampling and related services. It is the Town's intent to enter into a contract with a qualified firm to provide services on an as-needed basis. The nature of this assignment is to assist the Engineering Division staff by providing services in a timely manner as requested. The term of the assignment will be up to five years. See Section 9.

The Town will have sole discretion as to which projects, if any, will be assigned to the Consultant. The Town has separate "on-call" agreements for land surveying, engineering as well as architectural services and reserves the right to utilize any of the "on-call" agreements for all or portions of a project. In the event the Town does utilize an "on-call" firm for a portion of the work, the Town will supply the Consultant with the necessary information required to complete the Consultant's scope of services. The Consultant will also be required to coordinate their efforts with other Consultants the Town has retained.

The Town reserves the right to advertise by competitive bid or request a proposal for any project it deems appropriate. The selected Consultant will be afforded an opportunity to submit proposals on any advertised RFP outside the scope of this assignment. All work performed under this contract shall be under the direction of a professional engineer, licensed in the State of Connecticut.

2. Scope of Services:

The selected Consultant will be required to provide comprehensive engineering, environmental and related services (site, mechanical, electrical, geotechnical or any other specialty) required by an assignment.

The successful Consultant must be thoroughly familiar with State of Connecticut Department of Energy and Environmental Protection (DEEP) requirements and standards, EPA requirements and standards and all applicable local, state, and federal codes. The Consultant shall also have sufficient personnel to ensure that all work can be done in a timely manner and, at a minimum, must be able to provide the following:

- Land surveying and related services
- Environmental assessment and State of Connecticut Department of Energy and Environmental Protection (DEEP) Licensed Environmental Professional-related services
- Inland wetland delineation, soil scientist, and wetland biologist-related services

- Geotechnical engineering, and related subsurface investigation-related services
- Civil engineering and related design services including but not limited to: roadway, storm drainage, culvert, hydrology, soil erosion and best management practice, and hydrology/hydraulic analysis to develop construction plans, specifications, and cost estimate
- Landscape architecture and related services
- Permit assistance which will include preparing all required permits, meeting attendance, and presentations for Local, State and Federal permits
- Environmental engineering services
- Bidding assistance which will include preparing all bid documents requested by the Town, bid evaluation, and responding to requests for information from prospective bidders
- Construction consultation services
- Construction inspection, administration, and testing services

Attachment A provides a more detailed description of particular tasks representative of assignments and the level of detail expected from the Consultant.

3. Project Management:

The Managing Authority for this project will be the Division of Engineering. The Consultant will report to the Town Engineer or his designee.

The Consultant will provide and maintain project files, status reports, payment records, inspector's daily reports, schedules, bid summaries, delivery receipts, miscellaneous correspondence, etc.

4. Terms & Conditions:

The Consultant must be willing to adhere and agree to the following conditions of the Town for work, and they must have a positive statement to that affect in their proposal:

1. The Consultant must have, or must open an office in the vicinity of the East Hartford area. The actual or proposed location of the office must be identified in the proposal. Travel time between the Town and the Consultants' office will not be considered a reimbursable expense.
2. Have personnel reserve sufficient to assure task continuity, and agree that all personnel proposed are committed for the full duration of the contract. If a change is required, the Town shall be notified and will judge whether the substitution will impair the success of the project.
3. Agree that all sub-consultants hired by the Consultant must be approved by the Town prior to working on any project.
4. Agree that all work produced under this agreement is to become the property of the Town of East Hartford and to turn over to the Town all original documents upon completion or demand.

5. Agree to accept management direction from the Town and, specifically, the Managing Authority.
6. Agree to conform to all applicable laws, ordinances, and statues of the Federal Government, State of Connecticut, and Town of East Hartford which includes but are not limited to the following:
 - Signing and ink stamping of the plans by the appropriate professional licensed in the State of Connecticut
 - Civil Rights Act of 1964, as amended
 - Executive Orders numbers 1 & 3 of the State of Connecticut
 - Federal Labor Standards (29 CFR Parts 3, 5, and 5a) Davis Bacon Act, as amended (40 USC 327-330)
 - Copeland “Anti-Kickback” Act (18 USC 874), as supplemented in the Department of Labor regulations (20 CFR - Part 3)
 - Flood Disaster Protection Act (PL 93-29 1)
 - Hatch Act (Title 5 USC Chapter 15)
 - Section 504 of the Rehabilitation Act of 1973
 - Immigration Reform and Control Act of 1986
7. Agree that the Town reserves the right to terminate the contract at any time with the assurance that the Consultant shall be entitled to reimbursement for any services rendered prior to Receipt of Notice of Termination
8. Provide a statement that the applicant has no conflicting financial interests and is qualified to perform the services
9. Successful firm may not represent other clients before East Hartford Boards and Commissions without the written consent of the Town, which shall not be unreasonably withheld.

5. Selection Procedure:

All proposals submitted in response to this RFP will be reviewed against criteria listed in Section 6 and award of the contracts shall be made in accordance with the Town’s purchasing procedures. A selection shortlist of Consultants submitting RFP’s may be invited to an interview with, and to make a detailed presentation to the Selection Committee. Short-listed firms will be notified of the location and the time of interview at a later date.

A Selection Committee composed of Town staff will assist the Managing Authority in selecting Consultants to provide the requested services. The Town intends to award a contract to the most responsible Consultant, or to the Consultant whose proposal is determined to be in the best interest of the Town. The Town reserves the right to reject or modify any proposal or parts thereof for any reason, to negotiate changes to the proposal terms and to waive minor inconsistencies within this RFP.

6. Criteria for Selection:

Proposal packages will be evaluated in accordance with the following criteria:

- The Consultant’s demonstration that the firm and the personnel assigned to the assignment have adequate experience with similar assignments.
- The Consultant’s demonstration that the firm has adequate depth of staff and other resources to provide responsive and comprehensive services throughout the contract duration.
- The Consultant’s demonstration that they understand the services required to be provided for the potential assignments.
- Competitiveness of the Consultant's fees compared to the other firms that submitted for the assignment.
- Completeness of the proposal package with all of the information requested within the RFP.

7. Insurance:

The awarded Consultants will be required to furnish evidence of the insurance coverage within ten (10) days from the notification of the contract being awarded. Insurance coverage shall remain in full force for the duration of the contract term including any and all extensions. All renewal certificates shall be furnished at least ten (10) days prior to the policy expirations. See *INSURANCE AND INDEMNIFICATION REQUIREMENTS* above for minimum insurance requirements.

8. Additional Information and Revisions to Proposals:

Information may be provided to responsible respondents who anticipate submitting a proposal for the purpose of clarification to assure full understanding of, and responsiveness to, the solicitation requirements. Consultants shall be afforded fair and equal treatment with respect to access to additional information and revisions of the proposals.

9. Duration of Contract & Task Order Assignments:

- The agreement for services will expire five (5) years from the date of contract signing. In no event will the contract exceed a total duration of five (5) years. Individual service requests under this Bid will be authorized via an endorsed task order outlining the scope of services, proposed fee and schedule of the assignment.

10. Proposals:

Consultants wishing to be considered for this assignment should submit their qualifications on United States General Services Administration standard form 330 along with other information specified within the organization and content portion of this section.

All proposals must be received by **February 6, 2020 at 11 a.m.**

Three (3) copies (one original, two copies) along with a pdf electronic version of the proposal shall be submitted in a sealed envelope to:

**Michelle Enman, Purchasing Agent
Town of East Hartford
740 Main Street
East Hartford, CT 06108**

Proposals shall be plainly marked on the sealed envelope:

“Bid 20-14 Request for Proposals – Landfill Engineering Services”

Technical questions about this request for proposal may be directed to Douglas Wilson, P.E. Town Engineer, at 860-291-7380. All other questions are to be directed to Michelle Enman, Purchasing Agent, at 860-291-7270.

Proposal Organization and Content: (The proposal submitted shall follow the format below)

1. Cover Letter – this letter of transmittal shall include a statement accepting the terms and conditions specified within section 4 of this request for proposals.
2. Project and Assignment Understanding – This section will convey the Consultant understands of services to be provided under this assignment to the Town.
3. Firm information – This section shall include general information on the firm, information on all proposed sub-consultants, firm brochure, and a minimum of three client references with their contact information. This section will also include a detailed statement indicating the organizational structure under which the firm proposes to conduct business. The relations to any “parent” firm or subsidiary firm, with any of the parties concerned must be clearly defined.
4. Personnel and organizational structure – This section shall include an organizational chart of the personnel and sub-consultants that are intended to be allocated to this assignment. This section shall also include resumes, qualifications, and experience of the personnel identified within the organizational chart.
5. Experience – Provide a concise description of the firm’s experience including, but not limited to, the following:
 - Experience related to services noted within the scope of services
 - Experience with finding cost-saving/cost-effective solutions
 - Experience with providing timely and responsive services on similar assignments
 - Experience with providing environmentally sensitive solutions
 - Qualifications and experience of sub-consultants intended to be used on the project
 - Examples of effective services rendered during the construction phase of project designed by the firm
6. GSA Form 330 – Filled out with information relevant to this request.

7. Consultant Fees on the form provided within attachment B and Reimbursable Schedule.
(All markups shall be clearly identified.)
8. Services expected by the Consultant from the Town, exclusions, and any other material the Consultant feels appropriate to submit.

ATTACHMENT A

TYPICAL TASKS AND EXPECTATIONS

1.0 SAMPLE PROJECTS:

The list below is a partial list of anticipated projects which may be assigned to the consultant and is meant to be representative of the nature of assignments. The consultant's role is to supplement Town staff's experience, to meet project deadlines and provide a high level of expertise with Regulatory Authorities and their requirements.

1.1 Provide assistance with preparing Capital Improvement Project (CIP) requests for preparation of the annual Town Budget.

- Scope project with Town, prepare task order proposal within a week's time.
- Collect and review available reports and mapping, prepare a preliminary design plan or report for review.
- Prepare a cost estimate based on the preliminary design plan or report.
- Prepare a fee estimate for full design plans, specifications and bid documents.

1.2 Provide post-closure landfill monitoring services.

- Collect samples as required by DEEP Approved monitoring plan (see Appendix 1).
- Obtain lab analysis of samples.
- Generate report and submit to DEEP. Provide Town with approved reports.
- Comply with all DEEP requirements for post-closure landfill monitoring.

1.3 Assess closed landfills

- Inspect closed landfills for defects or other non-compliances.
- Review Town closure documents and other reports.
- Prepare and implement a subsurface exploration plan with geotechnical engineer's recommendation if required.
- Prepare reports of non-compliance items along with proposed solutions and cost estimate.
- Prepare priority list of non-compliance items to be repaired including cost estimates.
- Assist with federal, state and local permitting and project bidding.
- Review Contractor shop drawings.
- Develop items and schedule for routine maintenance by Town crews.

1.4 Post-Closure Reuse Design

- Transfer station modifications and improvements.
- Solar installation coordination
- Recreational use coordination and/or design

2.0 EXPECTATIONS:

The list below represents some general minimum expectations of the Town and is not intended to be a comprehensive list. At the scoping of each assignment, the Consultant's expected level of detail and degree of effort will be conveyed by the Town to the Consultant.

2.1 Design:

- All preliminary plans and contract documents must be submitted to the Town of East Hartford for review and comment. The preliminary set of contract documents will incorporate all pertinent Town of East Hartford standard contract sections. Also, an itemized cost estimate must accompany each submission.
- After final approval by the Town of East Hartford of all revisions to the preliminary submissions, a final set of the construction drawings, specifications, cost estimates, construction schedules, and contract documents will be prepared and submitted to the Town.
- All design work shall be certified by a Professional Engineer licensed by the State of Connecticut or another appropriate professional for each assignment.

2.2 Construction Inspection:

- At the scoping meeting for each individual inspection assignment, the Town will specify the required qualifications for the individuals assigned to inspect a project. At a minimum, inspectors shall have National Institute for Certification in Engineering Technologies (NICET) level 2 and New England Transportation Technician Certification Program (NETTCP) Concrete Inspector (CI) and Hot Mix Asphalt Paving Inspector (HMAPI) certifications. The Inspector shall have substantial prior experience and understanding of the practices and principals required for each of the projects. A thorough understanding and comprehension of each project's plans and specifications will also be required.
- If requested, the selected Consultant will provide an inspector(s) to monitor construction activities. The inspector will be required to enforce the plans and specifications, make measurements for payment, report to the Division of Engineering weekly on project status and maintain project schedules.
- At a minimum, daily logs will be kept by the Inspector which will briefly summarize the day's activities. The Town will prescribe or will solicit a recommendation from the Consultant minimum inspection and documentation effort for each assignment.
- The Inspector will maintain a safe working environment within his/her area of responsibility. Proper traffic detouring and pedestrian safety will be coordinated by the Inspector.
- The Inspector will hold a semi-final inspection. A review of that project will be performed with the Town of East Hartford and a punch list of items to be corrected will be developed by the Inspector.

2.3 Construction Survey:

- If required, the Consultant will be responsible for all required stake-out and / or construction layout for the project.
- All bench marks as shown on the plans shall be field-verified. All merestones (Town of East Hartford or private), iron pins, etc., shall be shown on the plans and all Town merestones shall be crossed and tied.
- All survey work shall be certified by a surveyor licensed by the State of Connecticut.

2.4 Construction Project Management:

- Fiscal Management - The Consultant will be responsible for tracking construction activities. Monthly Reports will be typed and submitted to the Town of East Hartford for payment to the construction contractor. Construction contractor payment disputes relating to the construction contract will be resolved by the Consultant with final approval from the Town. All change orders will be submitted by the Consultant with prior acceptance of the construction contractor. The Consultant will be the negotiating agent for the Town in determining reasonable and mutually-agreeable prices between the Town and the construction contractor for all additional work. The Town will make the final approval for all additional work.
- Status Report - The Consultant will be reporting formally to the Town of East Hartford monthly. A Project Management Report will be submitted which will outline the activities completed, any variance from the plan for the previous month and planned activities for the upcoming month.
- Project Coordination - The Consultant will coordinate the activities of the construction contractor, surveyors, inspectors, utility companies and others to insure conformance to the project schedules. Advance notification to utility companies shall be made in writing. The Consultant will hold a pre-construction meeting two weeks prior to the start of construction. The Consultant will be required to prepare all written communication relative to completion of the project. This will include requests for utility relocations and replies to questions from construction contractors, Town residents, and Town Departments.
- Record-Keeping - The Consultant shall submit copies of all project correspondence to the Managing Authority. In addition, the Consultant will maintain a duplicate set of files and a complete set of reproducible record drawings. Upon the completion of the contract, the Consultant will provide the Town with all test reports, inspections, field notes, measurements, material slips and other copies of material, including record drawings and pertinent data regarding the contract. These records shall be bound in chronological order, or as otherwise specified by the Town.

2.5 Monitoring and lab analysis:

- All sampling, lab analysis and compliance reports shall conform to EPA, DEEP and/or other agency requirements and the DEEP approved Water Quality Monitoring Plan.

ATTACHMENT B

**CONSULTANT HOURLY BILLING RATE SCHEDULE
FOR BID 20-14**

NAME OF CONSULTING FIRM: _____

Please indicate your firm's hourly fees over the three-year period of the contract.

<u>Billing Category</u>	<u>Hourly Billing Rate</u>
<u>1.0 ENGINEERING RELATED:</u>	
1.1 Principal	_____
1.2 Senior Licensed Professional/Specialist	_____
1.3 Licensed Professional	_____
1.4 Senior Engineer/Designer/Planner	_____
1.5 Engineer/Designer/Planner	_____
1.6 Draftsperson/Technician	_____
1.7 Clerical/Researcher	_____
<u>2.0 SAMPLING RELATED:</u>	
2.1 LEP	_____
2.2 Technician/Obtain Sample	_____
2.3 Unit price per sample	_____
2.4 Report including DEEP approval	_____
<u>3.0 CONSTRUCTION RELATED:</u>	
3.1 Senior Inspector (NICET IV) / Construction Manager	_____
3.2 Inspector (NICET III)	_____
3.3 Field Technician/Inspector (NICET II)	_____

Sub-consultant fees shall be reviewed and approved by the Town on a case by case basis as needed by each task order assigned to the Consultant.

RETURN THIS PAGE WITH YOUR BID OFFER



TOWN OF EAST HARTFORD, CONNECTICUT

STANDARD INSTRUCTIONS FOR BIDDERS

1. Sealed bid proposals will be received by the purchasing agent until the date and time indicated on the Invitation to Bid. Bids received later than the date and time specified will not be considered and will be returned unopened.
2. Bids are to be returned with the bid number prominently indicated on any other mailing envelope. The name and address of the bidder should appear in the upper left hand corner of the envelope.
Bids will not be accepted via fax or e-mail.
3. All proposals will be opened and read publicly and are subject to public inspection. Bidders may be present or represented at all openings. Bid results are mailed to all responding bidders.
4. Municipalities are exempt from any sale, excise or federal taxes. Bid prices must be exclusive of taxes and will be so construed.
5. The Town of East Hartford reserves the right to reject any or all bids or any part of all bids and to waive any informality when such action is in the best interest of the Town. The Town also reserves the right to extend by mutual consent an awarded bid when such action is in its best interest.
6. Bidders should familiarize themselves with all of the terms and conditions set forth in the bid specifications. Failure by the bidder to familiarize himself with these terms and conditions does not excuse the bidder from fulfillment of the bid specifications.
7. All entities doing business with the Town certify, upon acceptance of a bid and by virtue of their signature on that bid, that they have read, understood and will comply with the section of the Town's updated plan of affirmative action and equal opportunity relating to contractual and purchasing procedures – Section VIII Dated 01/88. The bidder agrees to cooperate fully should the Town choose to audit this compliance.
8. In case of an error in the extension or addition of prices, the unit price will govern. The Town will not be subject to any price increases after a bid award, unless it was part of the original bid terms.
9. The Town reserves the right to increase or decrease quantities listed in order to stay within the allocated funding at time of bid opening.
10. The Purchasing Department has the obligation to accept the lowest responsible bid which is in the Town's best interest. Factors include, but are not limited to: price, compliance to specifications, quality offered, freight costs, delivery time, past performance, standardization of current equipment, financial resources, technical qualifications, equipment and experience.
11. Bidders shall state in writing and attach to the bid, any conditions/exceptions that are part of the bid price. Comments to the effect "see literature" will not be acceptable.
12. Any manufacturers' names, trade names, brand names or catalog numbers used in the specifications are there for the purpose of establishing and describing general performance and quality levels. Such references are not intended to be restrictive and bids are invited on these and approved equal brands or products of any manufacturer.

TOWN OF EAST HARTFORD, CONNECTICUT

STANDARD INSTRUCTIONS FOR BIDDERS (*cont'd*)

13. The Town's competitive bidding process is not a means for competitors to obtain private/proprietary information that is not otherwise normally available. Such information relates to a bidder's financial records and responsibility, test data, manufacturing drawings, formulas and processes. To promote competition and protect valid interests this type of information/data will remain confidential.
14. All bidder questions shall be directed to the Purchasing Agent. Procedural and clarification questions will be answered appropriately. Questions that require an answer that will in effect change/alter the intent of the specifications will only be answered in writing to all bidders by a bid addendum.
15. Awarded bidders are responsible for obtaining all necessary permits as required by OSHA, Federal, State and/or Town regulations. Town permits will be issued at no cost.
16. Alternate proposals will not be considered unless specifically called for in the bid.
17. Prices shall include packing, transportation and delivery charges F.O.B. to East Hartford/delivered unless specifically noted otherwise.
18. Bidder declares that the proposal is not made in connection with any other bidder submitting a proposal for the same bid and is in all respects fair and without collusion or fraud.
19. Cash discounts may be offered by bidder for prompt payment of bills, but such cash discount will not be taken into consideration in determining the awarded low bidder except in the case of tie bids and then only provided such discount is based on payment of invoice not less than fourteen (14) days after satisfactory delivery and/or receipt of invoice, whichever is later.
20. The Town will not award a bid to any bidder who owes a delinquent tax to the Town. Bidders certify by virtue of their signature on the bid sheet that neither the bidder nor any business or corporation which the Bidder owns an interest in is delinquent in tax obligations to the Town. The Purchasing Department will verify that no delinquent taxes are owed before any bid is awarded.
21. All bidders shall include a corporate resolution with your submittal. Sample formats for Corporations and Professional Corporations, Limited Liability Company and Partnerships (including Limited Partnership and Limited Liability Partnership) are attached in this packet
22. The bidding entity is required to provide evidence from the Connecticut Secretary of State that they are in good standing and qualified to conduct business in the State of Connecticut.



TOWN OF EAST HARTFORD, CONNECTICUT

INSTRUCTIONS FOR CONSTRUCTION AND/OR LABOR SERVICE BIDS

1. A *Certificate of Insurance* naming the Town as an additional insured will be required of the awarded bidder. The insurance indemnification clause is contained with the bid specifications (see *Insurance Requirements*).
2. Before starting any work awarded bidders are responsible for obtaining permits as required by Federal, State, MDC, Utilities and/or Town regulations. Any applicable fees shall be included in the total bid price. Town of East Hartford permits will be issued at no charge.
3. The bidder shall abide by all OSHA, Federal, State and local laws, ordinances and regulation, which any manner affect those engaged or employed on the Work, or the materials or equipment used in the Work, or in any way affect the conduct of the Work, and no pleas of misunderstanding will be considered on account of ignorance.
4. It is the responsibility of each bidder before submitting a bid, to familiarize themselves with the specifications and conditions that may affect cost, progress, performance or completion of the project.
5. The awarded bidder may utilize the services of specialty subcontractors on those parts of the Work which, under normal contracting practices, are performed by specialty subcontractors. The awarded bidder shall not award any work to any subcontractor without prior written approval of the Town, which approval will not be given until the awarded bidder submits to the Town a written statement concerning the proposed award to the subcontractor, which statement will contain such information as the Town may require. The awarded bidder shall be as fully responsible to the Town for the acts and omissions of his subcontractors, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of person directly employed by him. The awarded bidder shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind subcontractors to the awarded bidder by the terms of the General Conditions and other contract documents insofar as applicable to the work of subcontractors and to give the awarded bidder the same power as regards to terminating any subcontract that the Town may exercise over the Contractor under any provision of the Contract documents. Nothing contained in this bid shall create any contractual relation between any subcontractor and the Town.
6. The awarded bidder shall not assign the whole or any part of this contract or any moneys due or to become without written consent of the Town, which in its sole discretion may be denied. In case the awarded bidder assigns all or any part of any moneys due or to become due under this contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and or any moneys due or to become due to the contractor shall be subject to prior claims of all person, firms and corporations for services rendered or materials supplied for the performance of the Work called for in this contract.
7. The submission of a bid offer will constitute an incontrovertible representation by the bidder that he/she has complied with every requirement of the specifications and that the bid

TOWN OF EAST HARTFORD, CONNECTICUT

INSTRUCTIONS FOR CONSTRUCTION AND/OR LABOR SERVICE BIDS (*cont'd*)

documents are sufficient in scope and detail and convey understanding of all terms and conditions for performance of the Work.



TOWN OF EAST HARTFORD, CONNECTICUT

INDEMNIFICATION AND INSURANCE REQUIREMENTS FOR CONSTRUCTION, PROFESSIONAL OR LABOR SERVICE BIDS

NOTE: CERTIFICATE OF INSURANCE WILL ONLY BE REQUIRED OF THE AWARDED BIDDER

A. INDEMNIFICATION

THE AWARDED BIDDER WILL BE REQUIRED TO AGREE TO THE FOLLOWING INDEMNIFICATION LANGUAGE

THE AWARDED BIDDER agrees on behalf of itself and its successors and assigns, covenants and agrees at its sole cost and expense, to protect, defend, indemnify, release and hold the Town of East Hartford, its agents, servants, officials, employees, volunteers and members of its boards and commissions (Collectively the "Town of East Hartford"), harmless from and against any and all Losses (defined below) imposed upon or incurred by or asserted against the Town of East Hartford by reason of bodily injury, personal injury, death, or property damage of whatsoever kind or nature, to any individuals or parties (including, but not limited to the Town of East Hartford, the Awarded Bidder, or any other third party) arising in whole or in part, directly or indirectly, out of or in any way relating to the contract. The term "Losses" includes any losses, damages, costs, fees, expenses, claims, suits, judgments, awards, liabilities (including, but not limited to, strict liabilities), obligations, debts, fines, penalties, charges, amounts paid in settlement, foreseeable and unforeseeable consequential damages, litigation costs, attorneys' fees, expert's fees, and investigation costs, of whatever kind or nature, and whether or not incurred in connection with any judicial or administrative proceedings, actions, claims, suits, judgments or awards.

Upon written request by the Town of East Hartford, the Awarded Bidder shall defend and provide legal representation to the Town of East Hartford with respect to any of the matters referenced above. Notwithstanding the foregoing, the Town of East Hartford may, in its sole and absolute discretion, engage its own attorneys and other professionals to defend or assist it with respect to such matters and, at the option of the Town of East Hartford, its attorneys shall control the resolution of such matters. Upon demand, the Awarded Bidder shall pay or, in the sole and absolute discretion of the Town of East Hartford, reimburse, the Town of East Hartford for the payment of reasonable fees and disbursements of attorneys and other professionals in connection with this contract.

**THE TOWN OF EAST HARTFORD WILL NOT AGREE TO INDEMNIFY THE AWARDED BIDDER;
SUBCONTRACTOR(S); OR INDEPENDENT CONTRACTOR**

B. INSURANCE

1. GENERAL REQUIREMENTS

The AWARDED BIDDER shall be responsible for maintaining insurance coverage in force for the life of this contract of the kinds and adequate amounts to secure all of the AWARDED BIDDERS's obligations under this contract with an insurance company(ies) with an AM Best Rating of A-VII or better licensed to write such insurance in the State of Connecticut and acceptable to the Town of East Hartford.

Additional Insured: The Town of East Hartford, its officials, employees, volunteers, boards and commissions must be included as an Additional Insured on the AWARDED BIDDER'S Insurance Policies (except Workers' Compensation and Professional Errors & Omissions). Evidence of this must be provided upon inception of this contract and upon renewal of insurance by the AWARDED BIDDER to the Town of East Hartford in the form of language on a Certificate of Insurance as well as a policy endorsement.

TOWN OF EAST HARTFORD, CONNECTICUT

INDEMNIFICATION AND INSURANCE REQUIREMENTS FOR
CONSTRUCTION, PROFESSIONAL OR LABOR SERVICE BIDS

(cont'd)

The AWARDED BIDDER shall provide the Town of East Hartford with a Certificate(s) of Insurance signed by an authorized representative of the insurance company(ies) prior to the performance of this contract describing the coverage and providing that the insurer shall give the Town of East Hartford written notice at least thirty (30) days in advance of any termination, expiration, or any and all changes in coverage. Such insurance or renewals or replacements thereof shall remain in force during the AWARDED BIDDER'S responsibility under this contract. Failure to provide or maintain any of the insurance coverage required herein shall constitute a breach of the Contract.

2. SPECIFIC REQUIREMENTS:

a) Commercial General Liability Insurance

The AWARDED BIDDER shall carry Commercial General Liability Insurance (broad form coverage) insuring against claims for bodily injury, property damage, personal injury and advertising injury that shall be no less comprehensive and no more restrictive than the coverage provided by Insurance Services Office (ISO) form for Commercial General (CG 0001 04/2013). By its terms or appropriate endorsements such insurance shall include the following coverage, to wit: Bodily Injury, Property Damage, Fire Legal Liability (not less than the replacement value of the portion of the premises occupied), Personal & Advertising Injury, Blanket Contractual, Independent Contractor's, Premises Operations, Products and Completed Operations (for a minimum of two (2) years following Final Completion of the Project). Any deviations from the standard unendorsed form will be noted on the Certificate of Insurance.

Type of Coverage:	Occurrence Basis
Minimum Amount of Coverage:	\$1,000,000 per occurrence
	\$2,000,000 aggregate
Policy Period:	Annual Policy

b) Workers' Compensation and Employer's Liability Insurance

The AWARDED BIDDER shall provide Statutory Workers' Compensation Insurance as required by the State of Connecticut, including Employer's Liability.

Amount of Coverage: Coverage A:	Statutory
Coverage B (Employer Liability):	\$500,000 Each Accident
	\$500,000 Disease, Policy Limit
	\$500,000 Disease, Each Employee

TOWN OF EAST HARTFORD, CONNECTICUT

INDEMNIFICATION AND INSURANCE REQUIREMENTS FOR
CONSTRUCTION, PROFESSIONAL OR LABOR SERVICE BIDS

(cont'd)

c) Commercial Automobile Liability Insurance

The AWARDED BIDDER shall carry Commercial Automobile Liability Insurance insuring against claims for bodily injury and property damage and covering the ownership, maintenance or use of any auto or all owned/leased and non-owned and hired vehicles used in the performance of the Work, both on and off the Project Site, including loading and unloading. The coverage should be provided by Insurance Services Office form for Commercial Auto Coverage (CA CA0001 10/2013) or equivalent. "Auto" (symbol 1 or equivalent) is required. Any deviations from the standard unendorsed form will be noted on the Certificate of Insurance.

Type of Coverage:	Occurrence Basis
Minimum Amount of Coverage:	\$1,000,000 combined single limit
Policy Period:	Annual Policy

d) Umbrella Liability Insurance

The Town requires the AWARDED BIDDER to carry an umbrella liability insurance policy of **\$5,000,000**.

3. PROFESSIONAL SERVICE CONTRACTOR REQUIREMENTS

(e.g., Architects, Engineers, et al.)

The AWARDED BIDDER shall carry Errors & Omissions coverage in the **minimum** amount \$1,000,000 per claim/\$1,000,000 annual aggregate for all professional services contracts. If the insurance coverage is written on a Claims-Made basis, an extended reporting period of at least 3 years after substantial completion of the project is required. Increased coverage limits may be required based on the scope, price and duration of the work to be performed. The Town of East Hartford will inform the **AWARDED BIDDER** as to the required limits for this insurance as soon as practicable, and has sole discretion of the limits to be required.

4. SUBCONTRACTOR REQUIREMENTS:

The AWARDED BIDDER shall require all subcontractors and independent contractors to carry the coverages set forth in section B. INSURANCE and will obtain appropriate Certificates of Insurance before the subcontractors and independent contractors are permitted to begin work.

The AWARDED BIDDER shall require that The Town of East Hartford, its officials, employees, volunteers, boards and commissions be included as an Additional Insured on all subcontractors and independent contractors insurance (except Workers' Compensation and Professional Errors & Omissions) before permitted to begin work.

The AWARDED BIDDER and all subcontractors and independent contractors and their insurers shall waive all rights of subrogation against the Town of East Hartford, and its officers, agents, servants and employees for losses arising from work performed by each on this contract.

**THE TOWN RESERVES THE RIGHT TO AMEND THE AMOUNTS OF
COVERAGE REQUIRED AND TYPE OF COVERAGE PROVIDED BASED ON
THE FINAL AGREED UPON SCOPE OF SERVICES**

NEW RESOLUTION FOR CORPORATIONS/PROFESSIONAL CORPORATIONS

(TO BE TYPED ON CORPORATION LETTERHEAD)

I (name of Corporation's Secretary), Secretary of (legal name of Corporation) a Corporation duly organized and operating under the laws of (State) and qualified and authorized to do business in the State of Connecticut, DO HEREBY CERTIFY that the following is a true, correct and accurate copy of a Resolution duly adopted at a meeting of the Board of Directors of such Corporation, duly convened and held on (Date of Meeting), at which meeting a duly constituted quorum of the Board of Directors was present and voted in favor of such Resolution.

RESOLVED: That the following Officers of this Corporation, or any one of them individually:

(Name and title of Officer or Officers)

are empowered to execute and deliver, in the name of and on behalf of this Corporation, contracts, bids and other documents to the Town of East Hartford, State of Connecticut, and are further authorized to affix the Corporate Seal to such documents and to bind the Corporation to such contracts, bids and other documents.

I further CERTIFY that such Resolution has not been modified, rescinded or revoked since the date on which it was enacted, and it is at present in full force and effect.

IN WITNESS WHEREFORE, the undersigned has affixed his/her signature and the Corporate Seal of the Corporation, this (date) day of (month) 20__

(Typed name of Corporation's Secretary)

SIGNATURE OF SECRETARY

(Corporate Seal)

PRIOR RESOLUTION FOR CORPORATIONS/PROFESSIONAL CORPORATIONS

(TO BE TYPED ON CORPORATION LETTERHEAD)

I (name of Corporation's Secretary), Secretary of (legal name of Corporation) a Corporation duly organized and operating under the laws of (State) and qualified and authorized to do business in the State of Connecticut, DO HEREBY CERTIFY that the following is a true, correct and accurate copy of a Resolution duly adopted at a meeting of the Board of Directors of such Corporation, duly convened and held on (Date of Meeting), at which meeting a duly constituted quorum of the Board of Directors was present and voted in favor of such Resolution.

RESOLVED: That the following Officers of this Corporation, or any one of them individually:

(Name and title of Officer or Officers)

are empowered to (recite resolution authorizing submission of bid or execution of contract).

I further CERTIFY that such Resolution has not been modified, rescinded or revoked since the date on which it was enacted, and it is at present in full force and effect.

IN WITNESS WHEREFORE, the undersigned has affixed his/her signature and the Corporate Seal of the Corporation, this (date) day of (month) 20__

(Typed name of Corporation's Secretary)

SIGNATURE OF SECRETARY

(Corporate Seal)

RESOLUTION FOR LIMITED LIABILITY COMPANIES

(TO BE TYPED ON COMPANY LETTERHEAD)

The undersigned, comprising all Members of (legal name of LLC), a Limited Liability Company duly organized and operating under the laws of (State) and qualified and authorized to do business in the State of Connecticut, DO HEREBY CERTIFY that the following is a true, correct and accurate copy of a Resolution duly adopted at a meeting of the Members, duly convened and held on (Date of Meeting), at which meeting a duly constituted quorum of the voting Members was present and voted in favor of such Resolution. We further CERTIFY that such Resolution has not been modified, rescinded or revoked since the date on which it was enacted, and it is at present in full force and effect:

RESOLVED: That the following Members of this Limited Liability Company, or any one of them:

(Name and title of Members)

are empowered to execute and deliver, in the name of and on behalf of this Limited Liability Company, contracts, bids and other documents to the Town of East Hartford, State of Connecticut, and are further authorized to bind the Limited Liability Company to such contracts, bids and other documents.

IN WITNESS WHEREFORE, the undersigned have executed this resolution, this (date) day of (month) 20__

(Typed Member Name)

(Typed Member Name)

(Typed Member Name)

(Typed Member Name)

RESOLUTION FOR LIMITED LIABILITY COMPANIES BY MANAGING PARTNER

(TO BE TYPED ON COMPANY LETTERHEAD)

I (name of Managing Member), Managing Member of (legal name of LLC), a Limited Liability Company duly organized and operating under the laws of (State) and qualified and authorized to do business in the State of Connecticut, DO HEREBY CERTIFY that the following is a true, correct and accurate copy of a Resolution duly adopted at a meeting of the Members, duly convened and held on (Date of Meeting), at which meeting a duly constituted quorum of the voting Members was present and voted in favor of such Resolution. I further CERTIFY that such Resolution has not been modified, rescinded or revoked since the date on which it was enacted, and it is at present in full force and effect:

RESOLVED: That the following Members of this Limited Liability Company, or any one of them:

(Name and title of Members)

are empowered to execute and deliver, in the name of and on behalf of this Limited Liability Company, contracts, bids and other documents to the Town of East Hartford, State of Connecticut, and are further authorized to bind the Limited Liability Company to such contracts, bids and other documents.

IN WITNESS WHEREFORE, the undersigned has affixed his/her signature, this (date) day of (month) 20__

(Typed name of Managing Partner)

SIGNATURE OF MANAGING PARTNER

RESOLUTION FOR PARTNERSHIPS

(TO BE TYPED ON COMPANY LETTERHEAD)

The undersigned, comprising all (partners/general partners) of (legal name of partnership), a (partnership/Limited Partnership/Limited Liability Partnership) duly organized and operating under the laws of (State) and qualified and authorized to do business in the State of Connecticut, DO HEREBY CERTIFY that the following is a true, correct and accurate copy of a Resolution duly adopted at a meeting of the voting (partners/general partners), duly convened and held on (Date of Meeting), at which meeting a duly constituted quorum of the voting partners was present and voted in favor of such Resolution. We further CERTIFY that such Resolution has not been modified, rescinded or revoked since the date on which it was enacted, and it is at present in full force and effect:

RESOLVED: That the following (partners/general partners) of this Limited Liability Company, or any one of them:

(Name and title of partners/general partners)

are empowered to execute and deliver, in the name of and on behalf of this (partnership/Limited Partnership/Limited Liability Partnership), contracts, bids and other documents to the Town of East Hartford, State of Connecticut, and are further authorized to bind the (partnership/Limited Partnership/Limited Liability Partnership) to such contracts, bids and other documents.

IN WITNESS WHEREFORE, the undersigned have executed this resolution, this (date) day of (month) 20__

(Typed partner/general partner Name)

(Typed partner/general partner Name)

(Typed partner/general partner Name)

(Typed partner/general partner Name)

APPENDIX 1

DEEP Landfill Monitoring Plan Approval

NOV 26 2019

**Bureau of Water Protection and Land Reuse
Remediation Division
APPROVAL**

Hon. Marcia Leclerc, Mayor
Town of East Hartford
740 Main Street
East Hartford, CT 06108

RE: East Hartford Municipal Landfill
Ecology Drive
East Hartford, CT

Dear Mayor Leclerc:

A water quality monitoring program (plan) for the East Hartford Municipal Landfill, dated September 17, 2018, was prepared and submitted on behalf of the Town of East Hartford (Town) by Anchor Engineering Services, Inc. The plan was submitted in conjunction with Consent Order SW-407 and with Section 22a-209-13 of Regulations of Connecticut State Agencies. The plan will modify the parameters analyzed, the annual frequency of sampling events, and the specific wells sampled under the water quality monitoring program conducted at the East Hartford Ecology Drive landfill under Condition No. 6 of the April 4, 2001 Closure Plan Approval.

Staff of the Remediation Division and Waste Engineering & Enforcement Division (Department) have reviewed and concur with the proposed modifications to the water quality monitoring program.

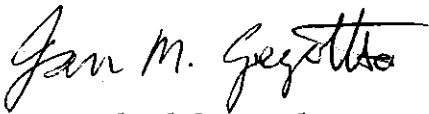
The above referenced monitoring plan is hereby approved, and Condition 6 of the April 4, 2001 Closure Plan Approval is amended accordingly.

Nothing in this approval shall affect the Commissioner's authority to institute any proceeding, or take any action to prevent or abate pollution, to recover costs and natural resource damages, and to impose penalties for violations of law. If at any time the Commissioner determines that the approved actions have not fully characterized the extent and degree of pollution or have not successfully abated or prevented pollution, the Commissioner may institute any proceeding, or take any action to require further investigation or further action to prevent or abate pollution. This approval relates only to pollution or contamination identified in the above referenced proposal.

In addition, nothing in this approval shall relieve any person of his or her obligations under applicable federal, state and local law.

If you have any questions pertaining to this matter, please contact either Thomas O'Connor at (860) 424-3769 or David McKeegan at (860) 424-3133.

Sincerely,



Jan Michael Czeczotka
Director
Remediation Division
Water Permitting & Land Reuse Bureau

attachment

C: Warren Disbrow, P.E., Assistant Town Engineer, East Hartford, CT 06108
D. Scott Atkin, LEP, Anchor Engineering Services, Inc, 41 Sequin Drive, Glastonbury, CT 06033
Robert Isner, DEEP
David McKeegan, DEEP
Tom O'Connor, DEEP



**STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION**



**AUTHORIZATION FOR CLOSURE OF A
SOLID WASTE DISPOSAL AREA**

**Municipality: East Hartford
Site of Activity: East Hartford Landfill, Ecology Drive
Authorization Holder: Town of East Hartford**

Pursuant to Connecticut General Statutes (CGS) Section 22a-208, Regulations of Connecticut State Agencies (RCSA) Section 22a-209-13 and Consent Order No. SW-407, the Commissioner of Environmental Protection (Commissioner) hereby issues this authorization to the Town of East Hartford to cap, with a synthetic geomembrane, and close the western landform of the East Hartford bulky waste disposal area ("landfill") located at 141 Ecology Drive, East Hartford, CT. The work authorized herein shall conform to the terms and conditions of this Authorization.

1. Landfill closure construction activities shall take place in accordance with the following:
 - (a.) Report entitled "Western Landform Closure Plan Town of East Hartford, CT" prepared by Stearns & Wheler, LLC dated January 1999.
 - (b.) Letter from James P. Blum, Stearns & Wheler, LLC to David McKeegan (WEED) dated May 22, 2000 providing additional information on the closure of the western landform.
 - (c.) Letter (with attachments) from James P. Blum, Stearns & Wheler, LLC to David McKeegan (WEED) dated February 13, 2001 appending information to the western landform closure plan. Attachments include a report entitled "Technical Specifications for Western Landform Closure at the Town of East Hartford, CT Landfill" prepared by Stearns & Wheler, LLC dated 2001 and a set of engineering drawings (Sheets G-1 through G-5, inclusive) entitled "Contract Drawings Western Landform Closure for the Town of East Hartford, Connecticut" prepared by Stearns & Wheler, LLC dated February 2001.
2. In accordance with paragraph B.8 of Consent Order No. SW-407 the authorization holder shall complete landfill closure in accordance with the schedule identified in paragraph 1.a above, but in no event shall the completion of the landfill closure, including seeding, be later than October 31, 2001.
3. No additional solid waste shall be disposed of at this site as a result of this authorization.
4. Staff from the Bureau of Waste Management's Waste Engineering and Enforcement Division (WEED) shall be notified in writing one week prior to the initiation of landfill closure construction activities.

5. The authorization holder shall submit as-built site plans (certified by a professional engineer licensed by the State of Connecticut) to the Commissioner within ninety (90) days of completion of the landfill closure in accordance with the requirements of RCSA Section 22a-209-13(f). The as-built plans shall include certification by a professional engineer that the grading and closure are as specified in the approved closure plan. The as-built plans and a detailed description of the disposal area shall be filed on the land records of the Town of East Hartford in accordance with RCSA Section 22a-209-13(g), including notice that use of the disposal area following closure requires approval of the Commissioner in accordance with RCSA Section 22a-209-13(d). A certified copy of this recording shall be forwarded to the Commissioner.
6. Upon closure of the landfill, the authorization holder shall implement the post-closure landfill maintenance and groundwater and surface water monitoring programs in accordance with the closure plan identified in paragraph 1.a, above and as may be amended by the Commissioner. Landfill maintenance and monitoring shall continue for at least thirty (30) years after landfill closure.
7. In accordance with paragraph B.10.e of Consent Order No. SW-407, the authorization holder shall register for the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities and submit for the Commissioner's review and written approval a Stormwater Pollution Control Plan pursuant to such permit.
8. At all times during landfill closure activities the authorization holder shall retain the services of a Quality Assurance/Quality Control Consultant (QAC) to document (in writing) that the landfill closure is being conducted in accordance with approved plans and specifications. The QAC shall be independent from the authorization holder and the Contractor and shall have experience as the QAC for landfill closure projects. A copy of the QAC's final closure certification report shall be provided to the Commissioner, upon completion of landfill closure activities.
9. The QAC shall ensure that all sedimentation and erosion controls are implemented and maintained for the duration of this landfill closure project. Prior to initiating landfill regrading and final cover application, the QAC shall certify, in writing, to the Commissioner that the sedimentation and erosion controls depicted in the closure plan have been installed.
10. The authorization holder shall ensure that all necessary odor controls are implemented and maintained during landfill closure activities.
11. Throughout implementation of landfill closure activities, the authorization holder or its contractor(s) shall prepare and comply with a site health and safety plan that complies with all applicable requirements of the Occupational Health and Safety Administration's (OSHA) 29 CFR Part 1910.120. A copy of said plan shall be provided to the Commissioner upon request.

12. In accordance with paragraph B.8.d of Consent Order No. SW-407, the authorization holder shall submit to the Bureau of Air Management (BAM) an evaluation of the landfill decomposition gas emissions and as necessary, submit a complete application for permits to construct and operate an active landfill decomposition gas collection system in accordance with the applicable requirements of RCSA Section 22a-174-3. This closure authorization does not preclude the authorization holder from complying with any and all gas emission recovery requirements as they exist and are modified.
13. This authorization is subject to and in no way derogates any present or future property rights or powers of the State of Connecticut and conveys no property rights in real estate or material nor any exclusive privileges and is further subject to any and all public and private rights and to any federal, state or local laws or regulations pertinent to the property or activity affected hereby.
14. This authorization may be revoked, suspended, or modified in accordance with law.
15. When this authorization requires that any document be submitted to the DEP, such document shall be delivered to: David M^cKeegan, Bureau of Waste Management, Waste Engineering & Enforcement Division, 79 Elm Street, Hartford, CT 06016-5127.

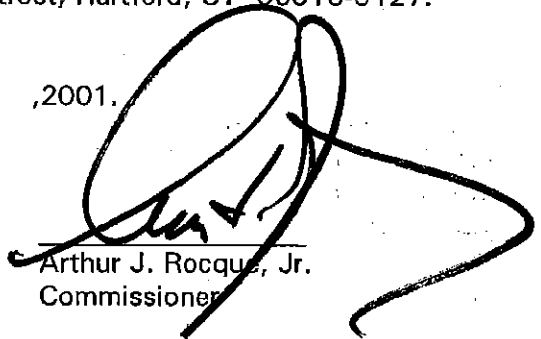
Issued this

4th

day of

April

,2001.



Arthur J. Rocque, Jr.
Commissioner

AJR:DM:dm



ANCHOR

ENGINEERING SERVICES, INC.

T: 860.633.8770
F: 860.633.5971
www.anchorengr.com

41 Sequin Drive • Glastonbury, CT • 06033

September 17, 2018

Mr. Thomas O'Connor
Department of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106-5127
Attention Mr. Thomas O'Connor

Re: Request for Monitoring Program Modification
East Hartford Landfill, East Hartford, CT

Dear Mr. O'Connor:

On behalf of our client, the Town of East Hartford, we are submitting this request to modify the existing Landfill Monitoring Program for the closed Landfill located along the Hockanum River off Ecology Drive in East Hartford, Connecticut. This site is part of a complex containing several municipal facilities and storage areas. The landfill consists of a larger western landform, and a smaller eastern landform which were capped and closed in 1999 and 2001, respectively. A site location map is included as *Figure 1*.

EXISTING MONITORING PROGRAM

Post-closure monitoring has been conducted at the site for seventeen years. The current monitoring program includes nine monitoring wells (MW-4, MW-5, MW-7S, MW-10, MW-11, MW-12, MW-13, MW-14, and MW-15) and ten surface water locations (SW-B, SW-B2, SW-B6, SW-C, SW-D, SW-E, SW-F, SW-G, SW-H, and SW-I). The general location of these monitoring points are described on the attached table (Form B) and they are shown on the attached site plan (Sheet 1 of 1).

Water quality samples are tested in the field for:

- pH
- specific conductivity
- temperature
- dissolved oxygen
- turbidity

Water quality samples are also analyzed in the laboratory for the following parameters:

- total dissolved solids (TDS)
- total suspended solids (TSS)
- alkalinity
- biological oxygen demand 5-Day (BOD)
- chemical oxygen demand (COD)
- ammonia
- nitrate
- sulfate
- chloride
- total iron
- total manganese
- volatile organic compounds (VOCs)

In addition, samples collected at MW-7S, SW-G, and SW-I are analyzed for PCBs during the June and December monitoring events.

Water quality monitoring at the groundwater monitoring wells and the surface waters is performed quarterly with monitoring reports submitted to the DEEP for each monitoring event.

Groundwater Results

The East Hartford Landfill is located on the banks of the Hockanum River in an area where the groundwater has been classified GB by the DEEP; the GB classification is used by the DEP to indicate that the groundwater is not suitable for direct human consumption without treatment. Most of the groundwater monitoring wells are located close river and to the toe of slope of the landfill's eastern or western landforms.

The ten monitoring wells in the current landfill monitoring program consist of standard 2-inch diameter PVC wells. The wells are nine to fifteen feet deep and screened at or near the overburden water table. Groundwater generally flows to the south / southwest towards the Hockanum River.

Recent groundwater data is presented in the attached Summary of Analytical Results (Form G) and the Total Volatile Organic Compounds Historical Trends (Form I) updated through June 2018. Analytical results can vary substantially from sampling event to sampling event.

The monitoring wells have been placed into four separate groups based on their relative locations around the site to evaluate their water quality. These four groups are:

- Group I: Well MW-7S, located between the eastern and western landforms.
- Group II: Well MW-10, located to the northeast of the western landform.

- Group III: Wells MW-4, MW-5, MW-11, MW-12 and MW-13, located along the downgradient toe of slope of the western landform.
- Group IV: Wells MW-14 and MW-15, located farther to the west and downgradient.

Group I

Monitoring well MW-7S is uniquely located along the banks of the Hockanum River and between the two landforms. Groundwater at this well does show signs of leachate impact. TDS, chloride, and iron concentrations are moderately elevated to elevated. Ammonia, COD, alkalinity, and manganese concentrations are generally slightly to moderately elevated. VOCs are typically detected at this well in elevated concentrations. Based on its location just downgradient of the eastern landform, this well is tested twice per year for PCBs. PCBs have been detected once in the past seven years. A PCB concentration of 0.64 µg/L was detected in June 2015.

Group II

Well MW-10 is located to the northeast of the western landform. Groundwater at this well is also impacted by landfill leachate. Ammonia, TDS, manganese, and iron are moderately elevated to elevated. COD, and alkalinity concentrations are generally slightly to moderately elevated. VOCs are usually detected at elevated concentrations; concentrations typically below those detected at well MW-7S.

Group III

Wells MW-4, MW-5, MW-11, MW-12, and MW-13 are located along the downgradient toe of slope of the western landform, near the Hockanum River. Concentrations of leachate indicator parameters (ammonia, TDS, manganese, iron, COD, alkalinity, and chloride) are generally moderately elevated to elevated at wells MW-4 and MW-5 and lower at wells MW-11, MW-12, and MW-13. For VOCs, the concentrations are very elevated at well MW-4, elevated at wells MW-11 and MW-12. Either lower concentrations or no VOCs are generally detected at wells MW-5 and MW-13.

Group IV

Wells MW-14 and MW-15 are located further west, downgradient, of the landfill with well MW-15 further away than well MW-14. Groundwater at these locations show some minor impacts from TDS, ammonia, chloride, iron, and manganese. VOCs are occasionally detected at well MW-14 at low concentrations with some recent spikes. VOCs have only been detected once at well MW-15 since 2001 and that detection was a very low concentration.

Groundwater monitoring well data is compared to the Surface Water Protection Criteria (SWPC). As the site is located in a GB area, there are no other applicable numerical criteria under the Remediation Standards Regulations (RSRs). The USEPA Primary and Secondary Drinking Water Regulation Maximum Concentration Limits (MCLs) have historically been used as a point of reference in evaluating potential relative impact of the individual landfill monitoring parameters (see attached Anchor Engineering prepared "Leachate Indicator Parameter – Groundwater Comparisons" table) on water quality, but these drinking water standards are not relevant to groundwater samples collected adjacent to a landfill.

Several volatile organic compounds (VOCs) have been detected at low concentrations in a number of the wells and surface water locations. The only constituent that was above the applicable SWPC in 2017 was tetrachloroethene (PCE) in downgradient monitoring well MW-4. PCE was detected at other wells downgradient of MW-4 at concentrations below the SWPC.

Surface Water Results

Recent surface water data is presented in the attached Summary of Analytical Results (Form G) updated through June 2018. Analytical results can vary substantially from sampling event to sampling event.

The surface water sampling locations have been placed into three separate groups based on their relative locations around the site to evaluate their water quality. These three groups are:

- Group V: SW-C, SW-D and SW-E, which are located to the northeast of the eastern landform.
- Group VI: SW-G and SW-I, which are located to the south of the eastern landform within the Hockanum River.
- Group VII: SW-B, SW-B2, SW-B6, SW-F and SW-H, which are located to the west of the western landform.

Group V

SW-C, SW-D, and SW-E all show significant impacts from landfill leachate indicator parameters: ammonia, COD, TDS, chloride, iron, and manganese. In reviewing 2014 – 2018 results, VOCs have been detected at low concentrations (1 – 3 µg/L) at SW-C with occasional detections at SW-D and SW-E. These locations are often dry and cannot be sampled during the third quarter (September) monitoring events. Continued monitoring of the “wet area” at SW-C, the tributary at SW-D, and the “upstream” location on the Hockanum River is redundant as the data is relatively consistent at the three locations.

Group VI

SW-G and SW-I are located just downstream of the eastern landform. TDS, iron, and manganese concentrations are moderately elevated and chloride is moderately elevated to elevated at these locations. Ammonia concentrations are low and, correspondingly, nitrate concentrations are higher. VOCs have not been detected in SW-G in the past four to five years, and have occasionally been detected at low concentrations at SW-I a few times in the past four to five years. These two surface waters are monitored twice per year for PCBs. PCBs were reported at concentration of 0.75 µg/L in June 2015 at SW-G. No other PCBs have been detected at these locations in the past seven years.

Group VII

SW-B, SW-B2, SW-B6, SW-F and SW-H are located to the west of the western landform. Similarly to Group V, the analytical results between these surface water locations are similar, except for SW-F which is described as “standing water”. Chloride concentrations are elevated. TDS levels are

moderately elevated to elevated. Ammonia, iron, and manganese concentrations are slightly to moderately elevated with the concentrations generally being moderately elevated to elevated at SW-F. COD and alkalinity concentrations are generally low, except at SW-F. VOCs have been detected with some variability at these locations, at somewhat high concentrations than the other locations, but in general have been consistent over the past four to five years.

Surface water data has been compared to DEEP Water Quality Standards (WQS). Surface water sample results in 2017 did not exceed the applicable WQS.

PROPOSED REVISIONS

We request that the monitoring well sampling locations be reduced to the following wells: MW-5, MW-7S, MW-10, MW-12, and MW-15. These five wells provide good coverage of the area covered in the current groundwater monitoring program:

- Well MW-7S is located near the Hockanum River and between the landforms in Group I.
- Well MW-10 is located northeast, close to, and slightly upgradient of the western landform in Group II.
- Well MW-5 is located west and cross-gradient of the western landform in Group III.
- Well MW-12 is located downgradient of the landfill near the Hockanum River in Group III.
- Well MW-15 appears to be located near the downgradient edge of the landfill's leachate plume in Group IV.

We request that the surface water sampling locations be reduced to the following:

- SW-D from Group V.
- SW-G and SW-I from Group VI.
- SW-H from Group VII.

No changes to the monitoring parameters are proposed at this time. The monitoring program currently includes leachate indicator parameters and VOCs. It also includes PCB monitoring at three locations twice per year.

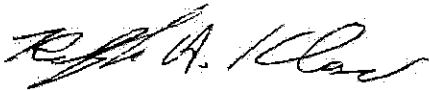
PCBs have been detected once each at MW-7S and SW-G in the last seven years. Detections have been less than 1 µg/L. Therefore, we request that the monitoring frequency for PCBs at these three locations be reduced to once per year in September.

We request that the monitoring and reporting frequency be modified from quarterly to semi-annually with sample collection in March and September.

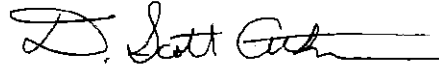
We feel that these modifications will continue to fulfill the Town's post-closure monitoring requirements, be protective of human health and the environment, and provide some budgetary relief to the Town of East Hartford, and ask that the DEEP grant this request.

If you have any questions or comments concerning this request to modify the East Hartford Landfill's post-closure monitoring program, please feel free to contact us at (860) 633-8770.

Sincerely,



Ralph A. Klass, PE, LEP
Senior Project Manager



D. Scott Atkin, LEP
Principal

Attachments:

- Figure 1 – Site Location Map
- Sheet 1 of 1 – Site Plan
- Form B – Sample Location / Designation Sheet (Dec 2017)
- Form G - Summary of Analytical Results (June 2018)
- Form I - Total Volatile Organic Compounds Historical Trends (June 2018)

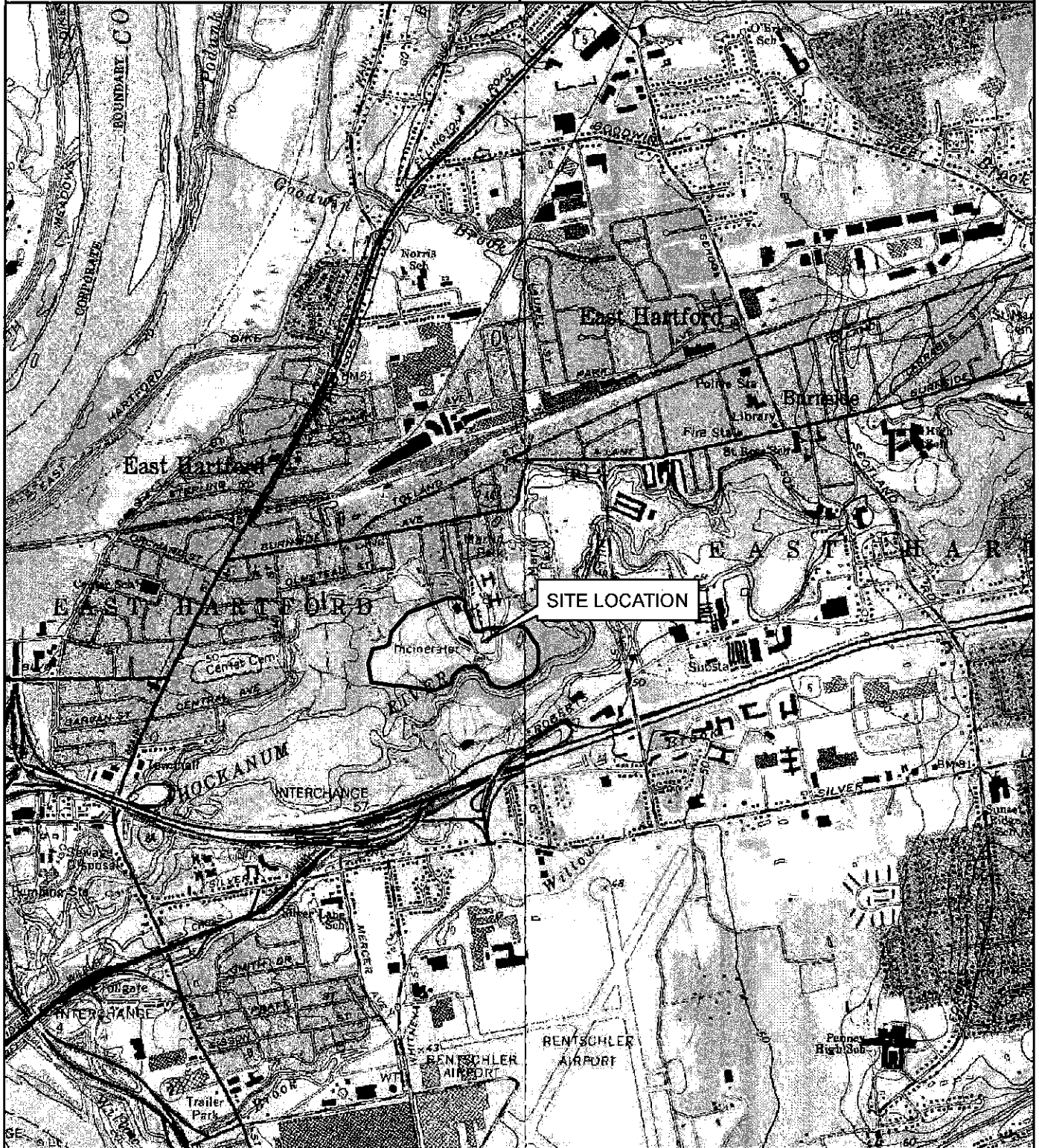
cc: Warren Disbrow, PE, Assistant Town Engineer, Town of East Hartford



ANCHOR
ENGINEERING SERVICES, INC.

41 Sequin Drive
Glastonbury, CT 06033
Phone: (860) 633-8770
Fax: (860) 633-5971

SITE LOCATION MAP
EAST HARTFORD LANDFILL
ECOLOGY DRIVE
EAST HARTFORD, CONNECTICUT



USGS TOPO
QUAD #'S 37 & 38
HARTFORD
NORTH &
MANCHESTER, CT

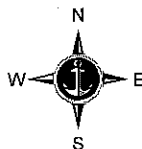


FIGURE
1

PROJECT
093-21

DATE
02/03/14

Town of East Hartford Landfill Monitoring Data Summary
Sample Location / Designation Sheet
Form B
December 2017 Sampling Event

Count	Sampling Location	Date	Time	Location Description
1	MW-4	12/15/2017	9:50	SW portion of Western Landform
2	MW-5	12/14/2017	14:10	West side of Western Landform
3	MW-7S	12/14/2017	11:13	SE side of Western Landform
4	MW-10	12/14/2017	12:18	NE side of Western Landform
5	MW-11	12/14/2017	14:10	West side of Western Landform
6	MW-12	12/15/2017	9:37	SW portion of Western Landform
7	MW-13	12/15/2017	11:22	SW portion of Western Landform
8	MW-14	12/14/2017	13:30	SW portion of Western Landform, off boardwalk
9	MW-15	12/15/2017	10:15	SW portion of Western Landform, off boardwalk
10	SW-B	12/15/2017	11:40	West side of Western Landform
11	SW-B2	12/15/2017	11:42	West of Western Landform, North of SW-B2
12	SW-B6	12/14/2017	13:31	West of Western Landform, South of SW-B2
13	SW-C	12/14/2017	9:55	Wet area North of Eastern Landform
14	SW-D	12/14/2017	9:45	Tributary West of the trail's steel bridge
15	SW-E	12/14/2017	9:50	In Hockanum River upstream from tributary
16	SW-F	12/15/2017	9:50	Standing water adjacent to MW-12
17	SW-G	12/14/2017	11:00	Between landforms, near building along river
17	Duplicate	12/14/2017	11:05	Collected at SW-G
18	SW-H	12/14/2017	13:35	In river near MW-15
19	SW-I	12/14/2017	11:15	South side of Eastern Landform

Town of East Hartford Landfill Monitoring Data Summary
Summary of Analytical Results
Form G
June 2018 Sampling Event

Location	2013				2014				2015				2016				2017				2018			
	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q
BOD	BDL	19	BDL	BDL	16	11	8.9	7.4	10	8.5	7.2	7.5	<4.0	<7.0	7.4	11	5.2	8.3	6.3	9.3	11	7.4		
Ammonia	13.9	3.41	13	15.3	13.1	13.7	14.8	12.1	13.3	13.5	12.0	11.6	0.43	9.68	12.6	11.4	4.05	7.29	11.8	12.5	11.2	10.8		
COD	75	33	61	83	77	96	106	82	71	89	83	74	36	81	78	71	55	81	81	99	74	65		
Nitrate	BDL	BDL	0.2	BDL	BDL	BDL	BDL	BDL	<0.05	<0.05	<0.05	<0.05	0.07	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.10	<0.05
Sulfate	18	19	35	NA	BDL	BDL	BDL	BDL	<3.0	<3.0	<3.0	<3.0	12.9	<3.0	<3.0	<3.0	5.1	<3.0	<3.0	<3.0	8.2	<3.0		
Alkalinity	377	213	394	377	415	426	389	371	380	396	426	347	74	329	355	307	225	332	317	292	128	311		
TSS	364	91	83	90	76	100	81	73	80	81	89	130	110	63	79	85	55	64	94	62	64	70		
TDS	1103	649	839	960	930	1,000	980	850	860	930	1,000	790	270	810	800	390	680	840	900	770	770	890		
Chloride	498	262	259	362	337	354	328	310	329	61.7	339	300	108	342	309	296	285	306	304	338	192	289		
Manganese	2.29	1.04	1.22	2.05	1.88	2.24	1.84	1.68	1.78	2.09	1.92	1.72	0.300	1.70	1.76	1.55	0.868	1.64	1.59	1.59	1.77	1.66		
Iron	71.3	7.83	25.6	50.7	34.3	48.7	37.1	29.9	42.8	45.2	43.5	41.2	13.0	33.2	34.1	30.8	16.6	32.4	31.4	29.6	34.1	31.9		

Location	2013				2014				2015				2016				2017				2018				
	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	
BOD	BDL	BDL	BDL	4.9	10	4.9	BDL	BDL	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	4.3		
Ammonia	BDL	0.06	0.56	0.85	0.65	0.73	0.77	0.58	0.44	0.52	0.53	0.48	0.29	<0.05	0.32	0.36	0.42	0.33	0.39	0.92	0.30	0.38			
COD	BDL	BDL	20	43	23	26	29	25	23	38	29	29	25	23	35	24	34	41	31	22	24	31			
Nitrate	2.3	0.7	0.9	0.06	BDL	BDL	0.11	BDL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.08		
Sulfate	17	8	35	NA	BDL	BDL	BDL	BDL	<3.0	<3.0	<3.0	4.4	7.2	<3.0	<3.0	8.8	11.6	<3.0	9.5	<3.0	7.0	<3.0			
Alkalinity	133	123	151	106	116	112	94	96	97	115	120	104	90	93	102	83	97	117	86	95	110	97			
TSS	5	5	28	35	35	36	29	18	24	48	25	80	68	49	47	80	200	250	41	44	42	52			
TDS	423	203	251	660	650	750	740	660	580	680	660	640	550	630	670	650	620	630	720	640	680	710			
Chloride	124	33.5	40.6	312	301	332	343	330	301	318	314	307	251	329	313	310	334	295	344	311	358	333			
Manganese	0.07	0.08	0.94	1.15	0.957	0.937	0.992	0.814	0.759	0.808	0.778	0.71	0.537	0.825	0.753	0.77	0.767	0.888	0.8	0.762	0.933	0.894			
Iron	2.52	1.44	21.5	25.7	18.9	19.9	21.5	17.5	18.0	19.0	17.6	18.4	9.71	15.0	13.8	13.1	16	21.6	13.3	13.5	17.0	16.4			

Location	2013				2014				2015				2016				2017				2018			
	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q
BOD	BDL	29	BDL	NS	4.7	BDL	BDL	5.0	<4.0	<4.0	5.6	-	<4.0	<4.0	-	-	5.3	<4.0	<4.0	<4.0	<4.0	<4.0		
Ammonia	0.6	0.64	0.89	NS	0.95	0.96	1.38	1.12	0.10	0.50	1.15	-	0.18	0.58	-	-	0.57	0.51	1.55	1.22	0.66	1.06		
COD	60	55	135	NS	32	22	29	80	15	31	141	-	28	66	-	-	44	37	46	59	104	235		
Nitrate	BDL	0.1	0.2	NS	0.45	BDL	0.10	0.17	2.60	<0.05	0.07	-	0.59	0.05	-	-	0.26	<0.05	0.05	0.24	<0.05	<0.05		
Sulfate	16	8	10	NA	3.6	5.0	BDL	BDL	20.8	8.7	<3.0	-	22.5	<3.0	-	-	63.8	16.7	<3.0	<3.0	18.7	<3.0		
Alkalinity	239	270	305	NS	366	324	334	414	299	343	416	-	279	411	-	-	301	415	452	413	271	366		
TSS	962	23	866	NS	3300	3300	2700	2500	31	49	4,000	-	53	1,000	-	-	69	430	3200	2,900	1400	65		
TDS	533	666	771	NS	590	480	720	780	370	430	460	-	380	550	-	-	670	630	670	520	380	540		
Chloride	106	163	232	NS	122	87.8	179	250	23.2	42.9	80.0	-	35.6	81.3	-	-	145	133	156	79.3	56.6	66.4		
Manganese	1.26	1.94	1.92	NS	0.820	0.740	0.867	1.42	0.071	0.584	1.73	-	0.022	0.645	-	-	0.367	0.978	0.58	0.909	1.520	3.25		
Iron	38.2	2.37	34.7	NS	45.4	6.71	13.6	17.6	0.744	0.598	1.40	-	0.768	5.94	-	-	1.16	4.28	6.27	14.6	31.2	109		
PCB	*	BDL	*	NS	*	BDL	*	BDL	*	0.64	*	-	*	<0.52	-	-	*	<0.48	*	<0.53	*	ND		

Location	2013				2014				2015				2016				2017				2018			
	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q
BOD	49	102	NA	36	32	23	77	40	18	20	41	10	14	39	29	12	15	19	20	11	17	14		
Ammonia	2.67	3.25	18.2	3.82	3.34	3.54	8.42	7.66	4.92	4.58	6.26	4.04	1.95	5.92	7.15	4.28	5.14	4.02	8.75	4.91	1.76	2.82		
COD	112	242	88	150	47	72	174	424	99	213	231	79	118	453	370	168	116	158	340	144	106	78		
Nitrate	BDL	0.1	NA	0.02	BDL	BDL	BDL	BDL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
Sulfate	51	56	NA	NA	3.7	BDL	4.3	BDL	<3.0	<3.0	<3.0	<3.0	4.1	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0		
Alkalinity	207	245	NA	282	274	237	316	298	261	216	272	199	137	168	278	280	241	227	305	241	151	195		
TSS	244	273	NA	110	46	120	740	200	150	420	650	120	81	560	190	190	56	120	170	100	120	65		
TDS	730	319	NA	490	400	290	400	220	460	420	320	190	110	440	420	460	680	400	390	240	220	240		
Chloride	272	39.8	NA	67.3	79.6	7.1	20.4	8.2	64.5	92.8	25.3	7.0	100	198	68.3	20.1	317	84.6	34.7	4.3	6.4	10.9		
Manganese	3.21	2.51	2.73	4.03	2.49	1.79	3.32	3.12	3.79	2.62	2.36	1.85	1.01	1.71	2.32	2.61	3.13	1.39	2.09	1.67	1.24	1.48		
Iron	28.9	28.2	18.6	14.8	28.8	23.4	52.3	34.6	43.0	35.1	30.5	24.1	17.0	30.6	27.9	27.4	39.4	21.9	30	17.1	15.1	15		

BDL - Indicates that the compound was analyzed but was not detected above the minimum laboratory detection limit.
 PCB sampling takes place during the June and December sampling events and only at locations MW-7S, SW-G, SW-I and the duplicate.
 - = No sample collected; location dry
 * = Not analyzed, per sampling plan

Town of East Hartford Landfill Monitoring Data Summary
 Summary of Analytical Results
 Form G
 June 2018 Sampling Event

Location	2013				2014				2015				2016				2017				2018			
	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q
SW-B	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	<4.0	18	<4.0	<4.0	<4.0	5.6	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
BOD	BDL	11	BDL	BDL	BDL	BDL	BDL	BDL	<4.0	18	<4.0	<4.0	<4.0	5.6	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Ammonia	0.05	0.22	0.07	0.21	0.18	0.24	0.11	0.07	0.15	0.07	0.06	0.09	0.10	0.25	<0.05	0.28	0.34	0.16	0.06	0.19	0.15	0.09		
COD	4	16	10	17	BDL	19	BDL	12	12	16	21	<10	19	34	14	124	29	22	14	20	<10	14		
Nitrate	2	2.1	1.4	1.56	1.69	0.66	1.15	0.94	1.53	1.13	0.94	1.11	0.58	1.04	1.05	0.63	1.46	1.22	1.62	1.65	1.42			
Sulfate	35	30	27	NA	22.9	9.4	19.2	21.9	21.9	18.7	19.0	23.3	15.7	19.5	21.3	22.2	20.9	25	22.4	27.0	22.9	21.4		
Alkalinity	106	65	60	51	51	51	56	70	62	60	61	59	51	52	65	38	47	69	67	59	68	56		
TSS	10	24	BDL	10	BDL	14	BDL	BDL	<5.0	11	6.0	<5.0	5.0	7.5	10	310	17	23	8	8.0	<5.0	35		
TDS	285	735	558	630	690	310	600	560	730	640	580	620	420	410	610	440	470	590	630	570	680	620		
Chloride	362	294	305	316	336	133	277	258	392	299	287	290	211	240	284	215	362	385	300	317	362	296		
Manganese	0.19	0.23	0.1	0.254	0.238	0.107	0.166	0.395	0.151	0.086	0.226	0.084	0.107	0.075	0.432	0.133	0.238	0.064	0.211	0.154	0.143			
Iron	0.68	1.88	0.44	1.63	0.455	1.08	0.238	0.487	0.977	0.673	0.521	0.466	0.484	1.03	0.577	5.21	1.34	1.55	0.661	0.388	0.501	0.593		

Location	2013				2014				2015				2016				2017				2018			
	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q
SW-B2	BDL	7	BDL	BDL	BDL	BDL	BDL	BDL	<4.0	<4.0	<4.0	<4.0	<4.0	6.3	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
BOD	BDL	7	BDL	BDL	BDL	BDL	BDL	BDL	<4.0	<4.0	<4.0	<4.0	<4.0	6.3	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Ammonia	0.09	0.21	0.06	0.18	0.18	0.26	0.18	0.04	0.17	0.08	0.09	0.10	0.10	0.25	<0.05	<0.10	0.24	0.14	0.07	0.19	0.20	0.12		
COD	10	11	6	15	BDL	22	18	BDL	12	16	14	<10	25	34	14	20	36	14	27	13	<10	48		
Nitrate	1.9	1.4	1.3	1.56	1.70	0.65	1.16	0.94	1.59	1.15	0.98	1.14	0.55	1.03	1.03	0.53	0.62	1.46	1.21	1.62	1.63	1.47		
Sulfate	32	30	27	NA	22.9	9.3	19.1	22.0	22.3	18.4	18.9	23.6	14.9	19.4	21.5	22.2	20.6	25.1	22.4	27.1	22.9	19.5		
Alkalinity	58	53	58	49	50	50	56	67	62	64	62	60	47	52	66	38	47	70	67	61	68	56		
TSS	26	6	BDL	BDL	BDL	20	BDL	BDL	<5.0	19	10	10	5.5	66	5.0	25	20	<5.0	13	7.0	<5.0	35		
TDS	671	561	558	680	700	310	610	560	720	630	590	610	410	480	620	440	450	590	620	570	680	620		
Chloride	73	306	292	346	348	133	285	269	390	309	294	292	204	242	269	213	257	260	271	325	362	296		
Manganese	0.22	0.2	0.11	0.226	0.239	0.151	0.882	0.156	0.382	0.163	0.133	0.208	0.084	0.106	0.070	0.154	0.131	0.144	0.102	0.209	0.163	0.139		
Iron	1.49	1.07	0.42	0.501	0.434	1.39	5.79	0.467	0.899	0.660	0.659	0.397	0.517	0.959	0.404	1.15	1.51	0.618	0.843	0.392	0.501	0.593		

Location	2013				2014				2015				2016				2017				2018			
	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q
SW-B6	BDL	16	BDL	BDL	BDL	BDL	BDL	BDL	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
BOD	BDL	16	BDL	BDL	BDL	BDL	BDL	BDL	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Ammonia	BDL	0.13	0.08	0.55	0.51	0.22	0.08	0.05	0.15	0.17	0.09	0.13	0.15	0.07	<0.05	0.08	0.19	0.19	0.08	0.21	0.23	0.10		
COD	7	24	6	39	16	22	BDL	12	<10	18	27	12	23	32	<10	14	29	24	25	11	<10	29		
Nitrate	11.3	0.9	1	1.10	1.22	0.52	0.95	0.71	1.22	1.00	0.81	0.86	0.46	0.75	0.93	0.47	0.53	1.17	1.04	1.11	1.19	1.20		
Sulfate	40	18	23	NA	19.3	7.2	17.4	19.4	18.9	16.2	17.5	21.0	14.0	15.6	19.4	21.8	20	21.9	19.8	22.5	20.9	17.8		
Alkalinity	7	73	60	57	55	46	58	74	64	73	65	65	54	41	68	42	48	75	69	60	69	61		
TSS	7	53	2	2400	45	110	BDL	BDL	<5.0	38	20	23	<5.0	27	<5.0	<5.0	14	<5.0	340	29	43	11		
TDS	393	359	454	470	510	240	530	460	550	510	530	520	330	350	560	380	430	520	540	500	550	550		
Chloride	120	128	239	217	240	93.2	239	227	268	261	260	241	148	152	260	189	223	234	234	231	281	258		
Manganese	0.07	0.24	0.11	0.42	0.589	0.141	0.076	0.162	0.199	0.046	0.085	0.238	0.115	0.104	0.065	0.134	0.161	0.112	0.297	0.194	0.189	0.115		
Iron	0.63	5.25	1.14	65.9	16.7	BDL	0.946	0.561	0.506	0.936	0.565	1.47	0.494	1.01	0.508	0.516	1.16	0.894	6.04	0.570	0.784	1.31		

Location	2013				2014				2015				2016				2017				2018			
	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q
SW-C	BDL	9	32	NS	11	7.0	NS	18	<4.0	15	<6.0	64	4.4	24	-	35	4.6	24	-	29	17	32		
BOD	BDL	9	32	NS	11	7.0	NS	18	<4.0	15	<6.0	64	4.4	24	-	35	4.6	24	-	29	17	32		
Ammonia	0.65	0.15	0.28	NS	1.80	2.02	NS	0.81	0.33	0.63	5.60	5.28	0.91	1.18	-	0.23	1.11	4.54	-	3.96	1.26	5.2		
COD	10	13	150	NS	25	46	NS	137	18	609	1,380	3,450	113	225	-	181	118	2910	-	1,170	104	1410		
Nitrate	1.7	3.6	0.2	NS	0.39	0.18	NS	BDL	0.89	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.5	<0.05	<0.05	-	<0.5	0.07	<0.02		
Sulfate	24	25	27	NA	5.3	5.1	NS	BDL	9.2	8.0	54.3	11.8	86.0	<3.0	-	55.8	125	8.8	-	17.9	26.2	<3.0		
Alkalinity	39	33	92	NS	265	208	NS	308	78	436	116	397	266	267	-	79	258	616	-	443	541	412		
TSS	6	68	1368	NS	290	230	NS	380	25	4,200	1,200	4,200	74	3,100	-	84	130	2600	-	5,200	520	4,000		
TDS	229	245	295	NS	580	390	NS	580	210	950	340	990	690	490	-	390	960	1,100	-	840	800	940		
Chloride	80.3	65.4	124	NS	155	91.2	NS	140	69.2	307	94.6	376	194	147	-	74.0	331	336	-	213	281	258		
Manganese	0.12	0.17	0.54	NS	0.207	0.277	NS	0.342	0.172	0.659	1.68	1.10	0.489	0.641	-	0.295	0.705	0.659	-	1.69	0.608	2.62		
Iron	0.47	1.29	17.8	NS	21.9	19.8	NS	24.7	3.58	116	200	587	30.9	41.5	-	8.72	20.8	53.5	-	262	84.8	2800		

Location	2013				2014				2015				2016				2017				2018			
	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q
SW-D	BDL	6	26	NS	NS	10	BDL	19	<4.0	35	-	65	7.0	-	-	5.6	<4.0	12	-	95	<4.0	100		
BOD	BDL	6	26	NS	NS	10	BDL	19	<4.0	35	-	65	7.0	-	-	5.6	<4.0	12	-	95	<4			

Location	2013				2014				2015				2016				2017				2018			
	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q
MW-11																								
BOD	12	7	BDL	4.8	4.3	BDL	BDL	BDL	<4.0	<4.0	<6.0	<4.0	<4.0	6.7	5.4	4.4	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Ammonia	0.5	0.31	0.25	1.16	1.19	1.72	2.14	0.64	0.81	<0.05	1.68	0.26	0.27	1.24	1.24	1.05	0.91	1.14	1.17	1.18	1.18	1.18	1.18	1.09
COD	26	10	38	26	16	24	40	16	16	21	42	40	15	73	35	29	67	41	31	28	24	38	24	38
Nitrate	BDL	0.3	0.3	0.02	BDL	BDL	0.08	BDL	<0.05	0.14	0.11	0.19	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	0.08
Sulfate	60	51	31	NA	20.5	28.5	28.1	22.5	15.9	10.0	21.0	17.1	14.6	15.7	12.6	13.8	12.1	24.6	39.8	37.2	76.2	75.6		
Alkalinity	53	50	74	139	117	209	187	107	110	69	169	66	62	120	132	100	92	121	127	106	171	157		
TSS	41	44	52	71	43	37	59	28	23	34	78	84	18	210	110	100	70	190	65	28	53	140		
TDS	201	136	205	490	500	600	630	250	440	140	630	180	330	580	640	630	530	580	610	570	550	650		
Chloride	15.7	22.4	21.5	168	178	186	204	73.0	165	21.7	252	86.8	146	276	281	276	265	204	239	239	237	211		
Manganese	0.12	0.08	0.11	0.43	0.387	0.393	0.726	0.098	0.415	0.133	0.724	0.14	0.139	0.726	0.645	0.48	0.469	0.717	0.57	0.590	1.09	0.971		
Iron	7.41	5.92	5.77	14.1	9.36	8.35	21.9	9.66	7.01	5.47	19.6	34.2	1.33	18.4	10.8	10.3	16.5	14.9	10	9.11	13.4	16.6		

Location	2013				2014				2015				2016				2017				2018			
	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q
MW-12																								
BOD	BDL	NS	BDL	4.2	BDL	BDL	BDL	5.7	<4.0	-	-	-	<4.0	-	-	4.4	<4.0	<4.0	-	<4.0	<4.0	-	-	-
Ammonia	BDL	NS	2.82	4.43	0.12	0.15	3.08	3.95	<0.05	-	-	-	0.13	-	-	1.77	0.11	0.3	-	0.41	0.08	-	-	-
COD	18	NS	52	59	14	13	42	52	12	-	-	-	77	-	-	69	29	60	-	20	11	-	-	-
Nitrate	2.2	NS	BDL	BDL	BDL	BDL	BDL	BDL	0.25	-	-	-	0.06	-	-	<0.05	0.67	<0.05	-	0.61	0.06	-	-	-
Sulfate	17	NS	30	NA	16.5	8.5	7.3	7.5	13.9	-	-	-	18.5	-	-	10.6	20.9	14.5	-	13.7	9.1	-	-	-
Alkalinity	113	NS	215	246	53	112	217	259	70	-	-	-	70	-	-	200	68	135	-	107	129	-	-	-
TSS	137	NS	198	660	330	180	1,200	130	99	-	-	-	360	-	-	310	110	350	-	270	52	-	-	-
TDS	210	NS	759	840	130	220	780	750	150	-	-	-	170	-	-	710	210	260	-	300	180	-	-	-
Chloride	14.6	NS	311	334	14.9	48.8	269	292	13.3	-	-	-	25.7	-	-	279	48.2	58.9	-	97.1	14.1	-	-	-
Manganese	0.06	NS	1.19	1.74	0.025	0.136	1.07	1.29	0.060	-	-	-	0.238	-	-	1.31	0.038	0.373	-	0.080	0.073	-	-	-
Iron	1.91	NS	20.1	70.7	3.06	1.71	20.9	19.3	8.80	-	-	-	25.2	-	-	33.9	4	50.7	-	4.05	7.86	-	-	-

Location	2013				2014				2015				2016				2017				2018			
	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q
MW-13																								
BOD	13	18	49	15	BDL	BDL	BDL	7.2	<4.0	<4.0	12	<4.0	<4.0	8.8	5.2	8.6	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Ammonia	BDL	2.04	14.4	22.3	0.33	0.15	17.5	23.7	0.52	1.28	18.7	18.5	0.05	16.2	14.0	19.4	0.1	0.52	19.3	0.26	0.75	10.4		
COD	35	30	81	98	27	28	61	88	31	40	72	74	30	192	114	82	44	41	76	33	<10	54		
Nitrate	4	0.5	0.2	0.79	1.72	0.16	BDL	BDL	0.15	0.22	<0.05	<0.05	1.18	0.10	<0.05	<0.05	3.25	0.18	<0.05	0.29	<0.05	0.09		
Sulfate	68	14	46	NA	57.3	54.1	29.0	7.9	64.3	72.1	8.5	6.5	69.5	30.0	7.8	3.5	123	96	9.2	79.7	17.2	37.4		
Alkalinity	403	713	683	825	422	665	638	767	381	547	692	640	337	615	546	580	453	672	648	487	67	640		
TSS	50	42	91	41	BDL	BDL	10	22	<5.0	<5.0	22	37	<5.0	8.5	42	77	5	<5.0	30	10	140	<5.0		
TDS	625	863	886	1,100	590	830	960	1,000	550	760	1,100	890	520	930	850	850	810	860	1,100	690	230	980		
Chloride	48.1	44.5	124	143	52.9	44.0	150	161	50.9	48.7	203	179	41.4	192	223	222	100	65.7	225	56.6	117	170		
Manganese	0.81	0.28	2.36	4.15	0.089	0.032	3.58	5.74	0.042	0.167	3.34	3.81	0.004	3.52	3.59	3.51	0.02	0.048	3.97	0.515	0.464	1.57		
Iron	14.2	10.3	18.9	16.9	0.548	0.374	4.06	11.2	0.712	1.43	16.1	20.6	0.279	2.64	22.3	41.1	1.25	0.929	15	5.18	5.19	5.05		

Location	2013				2014				2015				2016				2017				2018			
	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q
MW-14																								
BOD	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Ammonia	BDL	0.53	0.49	0.57	0.54	0.63	0.66	0.64	0.41	0.91	0.61	0.61	0.53	0.43	0.72	0.68	0.51	0.71	0.62	1.63	0.75	0.58		
COD	28	BDL	18	15	BDL	BDL	14	16	10	21	29	17	15	30	35	20	19	12	20	13	<10	14		
Nitrate	0.02	0.1	BDL	BDL	BDL	BDL	BDL	BDL	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.18	<0.05	<0.05	<0.05	<0.05		
Sulfate	81	27	25	NA	15.4	14.5	9.5	11.5	10.1	11.4	13.0	10.4	9.2	16.5	14.6	10.4	10.5	15.7	31.9	23.3	17.2	18.6		
Alkalinity	39	68	74	87	80	73	82	90	77	82	99	92	83	75	120	90	84	85	75	79	67	65		
TSS	13	56	40	280	240	230	220	100	120	160	400	160	180	220	380	180	180	110	350	110	140	62		
TDS	269	238	228	250	240	230	250	220	230	220	320	260	240	310	160	320	300	310	360	290	230	300		
Chloride	28.9	69.3	81.4	72.2	71.3	66.3	77.1	81.2	83.0	74.4	91.1	91.5	89.3	98.1	138	119	114	105	112	99.2	117	97.1		
Manganese	0.11	0.43	0.4	0.45	0.491	0.437	0.433	0.426	0.451	0.426	0.524	0.51	0.386	0.471	0.845	0.5	0.511	0.467	0.55	0.682	0.464	0.490		
Iron	6.97	11.7	5.72	9.34	10.1	8.64	7.36	6.43	9.80	7.41	14.5	10.0	5.26	5.76	18.8	6.44	7.09	5.49	9.62	9.78	5.19	9.98		

Location	2013				2014				2015				2016				2017				2018			
	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q
MW-15																								
BOD	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Ammonia	0.29	BDL	0.25	0.24	0.15	0.22	0.31	0.11	<0.05	0.08	0.23	0.20	0.07	0.19	0.33	0.17	0.12	0.31	0.36	0.28	0.18	0.18	0.79	
COD	36	8	13	17	BDL	BDL	12	18	10	18	25	29	28	19	25	20	25	24	23	26	<10	23		
Nitrate	BDL	0.4	0.2	0.09	0.08	0.06	BDL	0.63	1.46	0.09</														

Location	2013				2014				2015				2016				2017				2018			
	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q
SW-E	BDL	6	49	NS	BDL	BDL	NS	BDL	4.9	<4.0	-	8.4	<4.0	-	-	4.6	<4.0	9.2	-	30	<4.0	16		
BOD	0.63	0.13	1.12	NS	0.55	0.62	NS	0.08	0.90	0.55	-	0.18	0.19	-	-	0.17	0.16	1.86	-	1.40	0.26	1.84		
Ammonia	BDL	11	116	NS	19	22	NS	44	128	63	-	107	73	-	-	130	31	587	-	366	43	440		
COD	1.8	4.7	1.7	NS	0.63	0.18	NS	BDL	0.09	<0.05	-	<0.05	0.31	-	-	<0.05	0.06	<0.05	-	<0.05	0.98	<0.02		
Nitrate	24	21	58	NA	7.4	4.9	NS	39.1	59.5	<3.0	-	22.6	23.4	-	-	61.5	70.3	<3.0	-	26.5	11.2	4.1		
Sulfate	41	25	74	NS	76	117	NS	101	21	137	-	71	95	-	-	31	110	188	-	146	103	202		
Alkalinity	3	30	6212	NS	96	400	NS	110	1,500	80	-	1,900	200	-	-	53	7	2000	-	2,800	75	3600		
TSS	249	223	386	NS	220	250	NS	380	4,000	330	-	360	320	-	-	280	450	370	-	460	280	440		
Chloride	81.9	63	108	NS	75.1	71.0	NS	119	2,200	112.0	-	162	129	-	-	86.3	140	108	-	111	115	143		
Manganese	0.11	0.13	1.5	NS	1.27	0.190	NS	0.215	1.29	0.643	-	0.315	0.162	-	-	0.114	0.125	1.96	-	0.732	0.079	5.46		
Iron	0.32	0.94	87.7	NS	8.97	3.63	NS	10.5	150	17.9	-	28.3	3.49	-	-	0.731	1.02	40.8	-	52.6	4.49	977		

Location	2013				2014				2015				2016				2017				2018			
	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q
SW-F	BDL	7	BDL	BDL	16	14	NS	36	4.4	48	<20	18	<4.0	-	-	12	13	9.6	-	20	4.4	-		
BOD	0.53	0.11	0.21	0.22	3.95	1.97	NS	0.63	0.36	0.97	0.86	0.60	0.13	-	-	0.66	0.22	4.2	-	8.70	0.70	-		
Ammonia	4	11	10	74	44	50	NS	219	29	391	313	344	15	-	-	134	105	412	-	2,550	43	-		
COD	1.8	1.8	3.3	0.09	BDL	0.13	NS	BDL	0.08	<0.05	<0.05	<0.05	1.64	-	-	<0.05	0.21	<0.05	-	<0.05	<0.05	-		
Nitrate	24	64	29	NA	3.3	5.6	NS	7.9	9.6	<3.0	32.1	13.1	17.1	-	-	19.0	46.5	<3.0	-	<3.0	<3.0	-		
Sulfate	44	BDL	60	25	116	50	NS	46	54	93	28	66	55	-	-	33	49	131	-	196	BDL	-		
Alkalinity	7	19	6	50	1,000	530	NS	480	270	2,600	370	2,600	5.0	-	-	530	640	5600	-	39,000	56	-		
TSS	238	241	258	290	400	190	NS	230	120	250	250	360	270	-	-	280	390	450	-	670	850	-		
Chloride	82.4	63	93.5	144	156	77.4	NS	70.8	32.8	118	87.3	135	98.4	-	-	109	126	174	-	320	351	-		
Manganese	0.13	0.14	0.1	0.799	0.303	0.772	NS	1.93	0.420	5.35	3.12	1.72	0.264	-	-	0.623	0.713	6.54	-	6.01	1.15	-		
Iron	0.56	0.82	0.61	1.52	44.2	7.26	NS	10.6	13.1	71.4	11.4	27.4	0.708	-	-	3.72	1.87	139	-	307	4.19	-		

Location	2013				2014				2015				2016				2017				2018			
	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q
SW-G	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	8.2	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
BOD	0.58	0.12	0.11	0.23	0.51	0.30	0.13	0.22	0.25	0.09	0.16	0.24	0.13	0.09	<0.05	0.15	0.22	0.28	0.12	0.18	0.18	0.18	0.10	
Ammonia	BDL	BDL	7	13	BDL	11	BDL	BDL	<10	21	23	29	15	15	16	12	19	26	12	<10	<10	16		
COD	1.9	1.5	3.5	4.39	2.01	2.56	2.28	2.22	1.92	2.01	1.24	2.07	1.60	1.67	2.23	2.34	2.47	2.02	2.02	2.27	1.68	2.89		
Nitrate	31	19	31	NA	16.5	17.2	24.3	20.9	15.0	19.6	22.3	23.5	15.8	26.7	29.6	24.6	24.8	26.2	30.6	20.9	14.5	24.6		
Sulfate	35	45	58	66	51	51	71	66	44	70	70	77	55	71	81	73	68	76	75	55	43	59		
Alkalinity	6	97	BDL	7.0	5.5	10	BDL	5.0	<5.0	6.5	17	37.0	8.5	6.0	<5.0	9.0	15	160	15	7.0	5.0	14.0		
TSS	243	201	261	380	260	250	310	330	290	300	290	310	250	330	370	320	390	380	380	370	290	410		
Chloride	81.9	60.4	93.2	135	95.9	84.8	96.8	129	125	105	94.7	107	100	131	108	99.4	151	130	121	124	147	126		
Manganese	0.11	0.35	0.08	0.233	1.27	0.154	0.086	0.137	0.168	0.146	0.221	0.428	0.118	0.140	0.078	0.125	0.179	0.225	0.081	0.114	0.101	0.125		
Iron	0.38	2.35	0.33	1.13	0.374	0.784	0.230	0.312	0.339	0.588	1.03	2.65	0.508	0.365	0.286	0.389	0.427	1.83	0.365	0.357	0.332	0.991		
PCB	*	BDL	*	BDL	*	BDL	*	BDL	*	0.75	*	BDL	*	<0.50	*	<0.50	*	<0.47	*	<0.51	*	ND		

Location	2013				2014				2015				2016				2017				2018			
	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q
SW-H	BDL	7	BDL	BDL	BDL	BDL	BDL	BDL	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
BOD	0.18	0.05	0.12	0.18	0.20	0.07	0.02	<0.05	<0.05	0.10	0.07	0.13	0.32	<0.05	0.34	0.17	0.17	0.06	0.11	0.08	0.06			
Ammonia	1.2	10	8	13	BDL	19	12	BDL	<10	29	42	12	21	90	20	14	21	91	12	18	<10	14		
COD	14	3	0.7	0.84	0.88	0.50	1.02	0.63	0.93	0.86	0.77	0.66	0.33	0.70	1.01	0.31	0.36	1.09	1.05	0.87	0.86	1.19		
Nitrate	25	33	20	NA	15.2	7.8	19.5	16.2	15.2	11.5	12.2	15.9	11.5	9.6	13.8	21.9	17.3	14.5	13.2	15.1	15.9	13.7		
Sulfate	53	63	55	54	53	49	57	58	50	69	67	60	40	57	60	37	45	84	73	59	53	68		
Alkalinity	47	12	1	BDL	20	12	BDL	BDL	27	6.0	14	25	<5.0	71	<5.0	9.0	11	79	11	7.0	<5.0	110		
TSS	318	599	992	370	300	250	590	350	270	390	410	360	230	320	390	270	270	410	410	380	340	480		
Chloride	123	288	178	154	119	103	270	159	122	167	169	145	103	90	153	115	128	165	151	149	154	203		
Manganese	0.13	0.2	0.09	0.211	0.137	1.45	0.050	0.117	0.131	0.075	0.154	0.148	0.100	0.121	0.020	0.077	0.115	0.282	0.035	0.134	0.090	0.229		
Iron	2.5	1.14	0.49	9.68	2.87	10.2	0.304	0.466	1.67	0.627	2.49	2.10	0.375	3.14	0.187	0.336	0.637	9.72	0.80	0.541	0.440	6.71		

Location	2013				2014				2015				2016				2017				2018			
	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q	1st Q	2nd Q	3rd Q	4th Q
SW-I	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
BOD	0.6	0.06	0.13	0.26	0.57	0.28	0.17	0.24	0.24	0.11	0.27	0.18	0.14	0.16	<0.05	0.25	0.35	0.45	0.43	0.17	0.26	0.08		

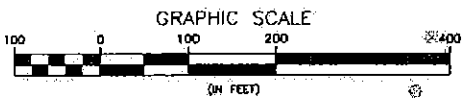
Town of East Hartford Landfill Monitoring Data Sheet
Total Volatile Organic Compounds Historical Trends (ug/L)

Form I
June 2018 Sampling Event

Sampling Event	Date of Sampling (M/ D ₁ -D ₂ / Y)	MW-4	MW-5	MW-7S	MW-10	MW-11	MW-12	MW-13	MW-14	MW-15
2nd Quarter 1999	6/21/1999	35,087	0	211.6	147.5	6,067	8,069	7.6	2.8	7.3
3rd Quarter 1999										
4th Quarter 1999	11/10/1999	36,700		322	79	367	619	0	12	0
1st Quarter 2000	2/1/2000	42,800	7	482	454	12,664	4,370	0	1.4	1
2nd Quarter 2000	5/1/2000	48,205	0	2,239	1,063	3,291	84	1	0	2
3rd Quarter 2000	8/3/2000	53,050	17		62	210	14,810	7	1	0
4th Quarter 2000	11/15/2000	27,276	2.7	30.6	393	2,528	4,859	8.3	5	139
1st Quarter 2001	2/2/2001	21,002	4.3	24.1	300.4	287.1	11.3	4.7	4.7	2.6
2nd Quarter 2001	6/28/2001	37,677		465	243	905	3,015	5	0.8	0
3rd Quarter 2001	9/27/2001	30,098	2.2	60.6	51	7,420	6,151	20.7	0.7	1.7
4th Quarter 2001	12/5/2001	25,491	2	65		3,974	4,345	14.7	30	1
1st Quarter 2002	2/2/2002	19,100	0	19.6	370	2,510	3,800	0	0	0
2nd Quarter 2002	6/11/2002	17,000	5.5	1,358	198.5	2,380	2,100	0	0	0
3rd Quarter 2002	9/16/2002	10,020	0	98	144.2	2,380	2,800	31.8	0	0
4th Quarter 2002	12/19/2002	5,500	0	880	1900	947	0	0	0	0
1st Quarter 2003	3/26/2003			1,151.8	637					
2nd Quarter 2003	6/4/2003	10,897	5.6	1,696	180.2	1,696.5	3.3	0	0	0
3rd Quarter 2003	9/29/2003	7,606	2.38	44	160	3,881.3	1,188.1	7	0	0
4th Quarter 2003	12/29/2003			1,072	2150					
1st Quarter 2004	3/11-12/2004	18,935	0	186	6,327	9,109	0	0	0	0
2nd Quarter 2004	6/22-23/2004	15,612	28	314	414	11,772	3,932	1.3	0	0
3rd Quarter 2004	9/8-9/2004	9,382	0	70	1,353	3,630	2,855	17.9	2.6	0
4th Quarter 2004	12/8-9/2004	7,574	0	85	1,532.9	60.4	464	0	0	0
1st Quarter 2005	3/2-3/2005	10,475	0	1,721	1708	0	87	0	0	0
2nd Quarter 2005	6/1-2/2005	17,760	12.8	445	1185	6,462	1,229	0	0	0
3rd Quarter 2005	9/8-9/2005	11,692	0	37	464	6,086	4,243	29	2.3	0
4th Quarter 2005	12/7-8/2005	1,708	1.8	1,052	698	221	56	0	0	0
1st Quarter 2006	3/1-2/2006	29,074	0	1,269	1,319	478	754	0	0	0
2nd Quarter 2006	6/20-21/2006	8,242	5.9	2,184	1,246	49	16	0	0	0
3rd Quarter 2006	9/12-14/2006	25,730	0	117	174.1	90	4,097	1.4	0	0
4th Quarter 2006	12/6-14/2006	25,730	0	117	174.1	90	4,097	1.4	0	0
1st Quarter 2007	3/6-8/2007	15,410	1.0	327.8	882.3	713.0	3.6	0	0	0
2nd Quarter 2007	7/21-22/2007	20,670	0	1,209.7	64.60	96	3,595.1	0	0	0
3rd Quarter 2007	9/6-7/2007	3,730	117		74.00	10,710	13,480	15.0	0	0
4th Quarter 2007	9/20-21-24/2007	8,300	0		91	33	3,290	9,620	0	0
1st Quarter 2008	3/18-24/2008	5,343	60.0	164.0	387.0	3.0	0.0	0	0	0
2nd Quarter 2008	6/25/2008	15,696	31.0	361.0	215.0	6.0	1,129	0	0	0
3rd Quarter 2008	9/24/2008	5,161	23.0	1,064	51.0	39.0	1,705	0	0	0
4th Quarter 2008	12/29/2008	4,300	8.0	1,180	306.0	4.0	0.0	0	0	0
1st Quarter 2009	3/17/2009	18,272	0	1,329	404.0	0	0.0	0	0	0
2nd Quarter 2009	6/24/2009	3,661	0	582.0	75.0	0	2,972	0	0	0
3rd Quarter 2009	9/23/2009	889	0	0	39.0	10,380	6,780	0	0	0
4th Quarter 2009	12/21/2009	15,410	0	1,073	60.0	9.0	2.0	0	0	0
1st Quarter 2010	5/6/2010	17,703	4.0	1,638	45.0	0	0.0	0	0	0
2nd Quarter 2010	6/29/2010	18,490	4.0	246.0	25.0	8,097	5,633	0	0	0
3rd Quarter 2010	9/29/2010	3,252	3.0			930.0	3,420	4.0	210.0	0
4th Quarter 2010	12/6/2010	9,967	0	10.0	85.0	65.0	0	0	0	0
1st Quarter 2011	4/5/2011	15,605	56.0	708.0	175.0	11.0	1.0	0	0	0
2nd Quarter 2011	6/20/2011	6,880	6.0	393.0	42.0	17.0	0	0	0	0
3rd Quarter 2011	9/28-9/2011	6,720	0.9	250.6	17.1	25.9	7.3	0	0	0
4th Quarter 2011	12/19-20/12	1,273	0	448.0	25.0	3.0	0	0	0	0
1st Quarter 2012	4/4/2012	13,118	0	355.0	36.0	22.0	49.0	0	0	0
2nd Quarter 2012	7/1-2/2012	15,638	0	335.0	9.0	6.0	2,060	0	0	0
3rd Quarter 2012	9/24/2012	15,185	0	13.0	6.0	1,643	4,179	0	0	0
4th Quarter 2012	12/29-30/2012	14,129	0	90.0	60.0	3.0	0	4.0	0	0
1st Quarter 2013	3/27-28/2013	17,030	18.0	671.0	105.0	21.0	0	0	0	0
2nd Quarter 2013	6/25-26/2013	10,671	69.0	1,509	24.0	1.0		0	0	0
3rd Quarter 2013	10/15-16/2013	4,995	44.0	342.0	4.0	13.0	5,114	0	0	0
4th Quarter 2013	12/18 -19/2013	14,966	0	N/S	0	2,036.1	3,829.8	0	0	0
1st Quarter 2014	3/10-11/2013	21,200	0	2,650.6	177.7	1,370.4	0	0	0	0
2nd Quarter 2014	6/11/2014	32,900	0	2,259.5	75.7	4,455.9	58	1.5	0	0
3rd Quarter 2014	9/3/2014	21,889	1.3	313.0	19.6	3,804.0	4,125	4.9	0	1.0
4th Quarter 2014	12/2/2014	17,251	0	38.4	66.3	21.1	5,333	8.8	0	0
1st Quarter 2015	3/2/2014	16,085	0	1,257.91	285.3	1,694.7	0	0	0	0
2nd Quarter 2015	6/10/2015	22,828	0	1,087.20	39.6	1.1		0	0	0
3rd Quarter 2015	9/16/2015	23,456	0	536.90	8.9	3,112.6		6.8	0	0
4th Quarter 2015	12/21/2015	11,480	0		24.5	3.5		0	11	0
1st Quarter 2016	3/2/2016	1,960	15.7	54.3	85	537.2	0	0	5.7	0
2nd Quarter 2016	6/28/2016	19,985	2.3	130.1	22.8	1,621.9		1.9	3.5	0
3rd Quarter 2016	9/26/2016	15,290	0		17.9	1,264		9.7	720	0
4th Quarter 2016	12/7/2016	9,711	0		4.1	419.4	1,771	8.6	160	0
1st Quarter 2017	3/8/2017	5,817	0	355.3	74.2	39	0	0	6.5	0
2nd Quarter 2017	6/19/2017	20,759	9.4	650.3	11.6	1,060.6	14.7	0	2.2	0
3rd Quarter 2017	9/21/2017	20,555	0	36.9	12.1	1,789		5.8	4.5	0
4th Quarter 2017	12/14-15/2017	15,589	1.2	155.2	34.8	1,167	0	0	1.2	0
1st Quarter 2018	3/12/2018	27,818	0	10,88.2	29.6	3,461.5	0	0	0	0
2nd Quarter 2018	6/18-19/2018	23,505	0	150.7	21.1	3,500.0		4.2	0	0

Blank Space = Location was not sampled, 0 = Not Detected

ANCHOR Engineering Services, Inc.

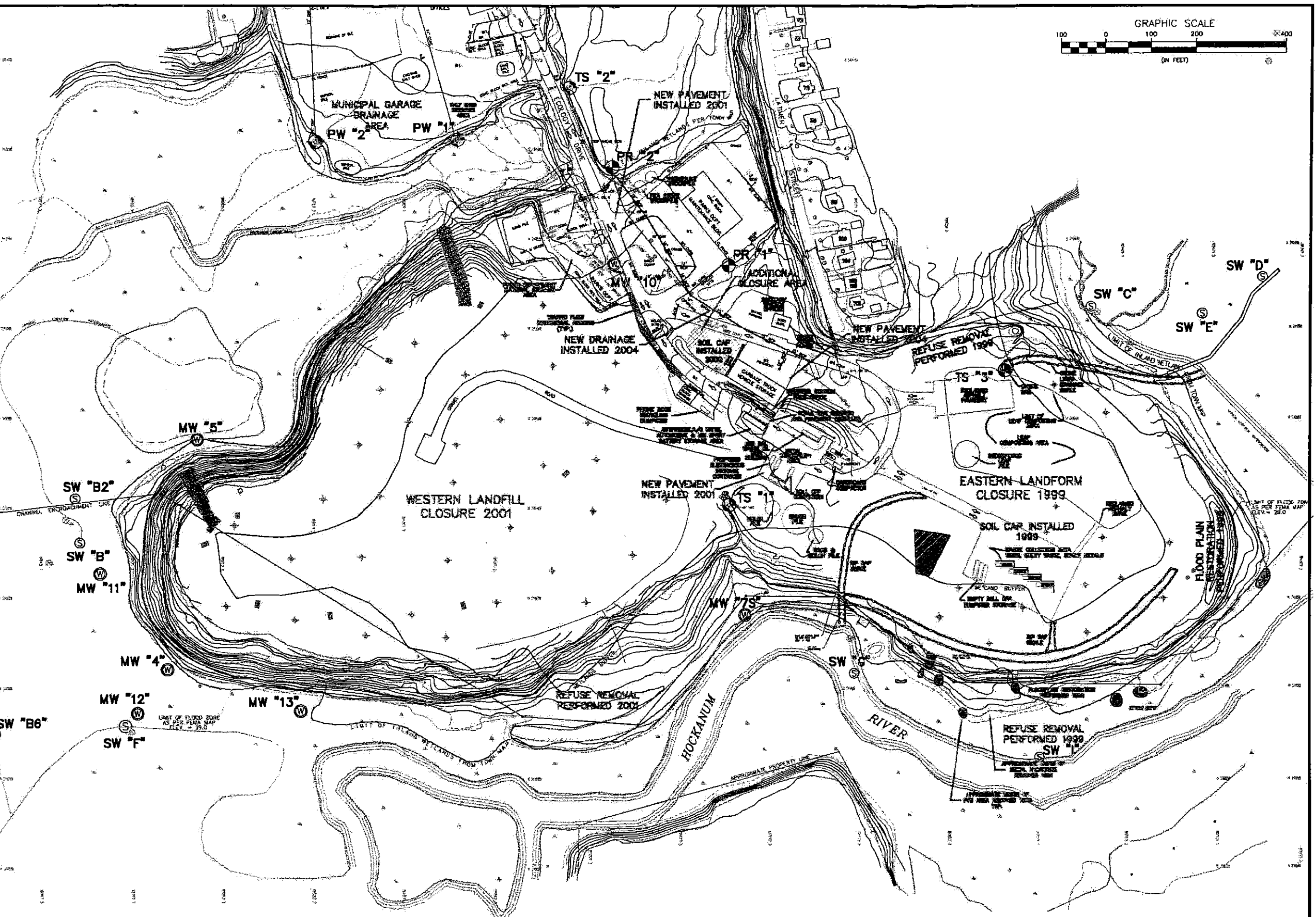


LEGEND

(Symbol)	QUARTERLY MONITORING WELL SAMPLING POINT
(Symbol)	QUARTERLY STORMWATER SAMPLING POINT
(Symbol)	QUARTERLY SURFACE WATER SAMPLING POINT
(Symbol)	WELL
(Symbol)	CONCRETE
(Symbol)	ASPHALT
(Symbol)	GRAVEL
(Symbol)	SOIL
(Symbol)	ROCK
(Symbol)	WOOD
(Symbol)	STEEL
(Symbol)	GLASS
(Symbol)	PLASTIC
(Symbol)	PAINT
(Symbol)	OTHER

SURVEY INFORMATION/NOTES:

1. BASE MAPS COMPILED FROM PHOTOGRAMMETRY DATED 4/20/04
2. PHOTOGRAMMETRY BY JAMES W. STOKES & ASSOCIATES
3. CONTROL SURVEY AND SET BY JAMES W. STOKES & ASSOCIATES
4. 200 FOOT GRID BASED ON CONVENTIONAL COORDINATE SYSTEM (NAD 83)
5. VERTICAL DATUM BASED ON NAVD 83
6. UNDERGROUND FACILITIES AS SHOWN ARE BASED ON LIMITED FIELD INVESTIGATION AND AVAILABLE DATA PROVIDED BY OTHERS. LOCATIONS ARE APPROXIMATE ONLY AND SOME FACILITIES MAY NOT BE SHOWN.
7. PROPERTY LINES ARE BASED ON RECORDS ON FILE IN THE OFFICE OF EAST HARTFORD ENGINEERING DEPARTMENT. IT IS NOT TO BE CONSTRUED AS HAVING BEEN SURVEYED AS THE RESULT OF A FIELD SURVEY, AND IS SUBJECT TO SUCH CHANGES AS AN ACCURATE REBOUND SURVEY MAY DISCLOSE.
8. AS-BUILT SURVEY INFORMATION ON THE CONSTRUCTION OF THE EASTERN LANDFILL AND THE TRUNKLINE STATION WAS SUPPLIED BY DESIGN ENGINEERING SERVICES INC. DATED 01/01/03.
9. AS-BUILT SURVEY INFORMATION ON THE WESTERN LANDFILL WAS SUPPLIED BY BROWNLEE LTD DATED 12/04/01.
10. AS-BUILT INFORMATION FOR THE ADDITIONAL CLOSURE AREA OFF ECOLOBY DRIVE WAS SUPPLIED BY THE OFFICE OF EAST HARTFORD ENGINEERING DEPARTMENT.
11. GENERAL CLASSIC AS-BUILT PLAN WAS PROVIDED BY STEARNS & WHEELER, LLC. ENGINEERING, ARCHITECTURE & SCIENTISTS. DATED 10/04. LAST REVISED 11/06. 400 TO 02046.



NOTES:
 Underground facilities, structures, and utilities have been plotted from available surveys and records, and therefore their locations are to be considered approximate only. There may be others, the existence of which is presently not known. Anyone using utility information and data provided herein shall "Call before you dig" at 1-800-322-4455 forty eight (48) hours in advance to verify the location of utilities prior to start of construction.

MAP NOTES:
 This plan was compiled from other maps, record research or other sources of information. It is not to be construed as having been obtained as the result of a field survey, and is subject to such change as an accurate field survey may disclose. Existing base mapping was provided by Stearns and Wheeler, LLC. See notes 1 thru 10 above. Modifications were made to the existing plan to reflect changes to date for planimetric purposes only.

To my knowledge and belief, this map is substantially correct as noted hereon.
 M. Denise Horan, P.E.
 CT. P.E. Number

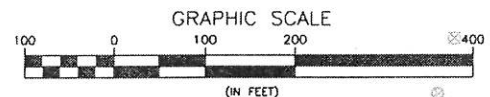
NO.	DATE	DESCRIPTION	BY

TOWN OF EAST HARTFORD
 POST-CLOSURE LANDFILL MONITORING /
 STORMWATER OUTFALL SAMPLING LOCATIONS
 GENERAL PERMIT for the DISCHARGE of
 STORMWATER ASSOCIATED WITH INDUSTRIAL ACTIVITY.

DATE: 2/25/2008
 DRAWN BY: AMT
 SHEET: 1 / 1

APPENDIX 2

DEEP Landfill Monitoring Plan Well Location Map

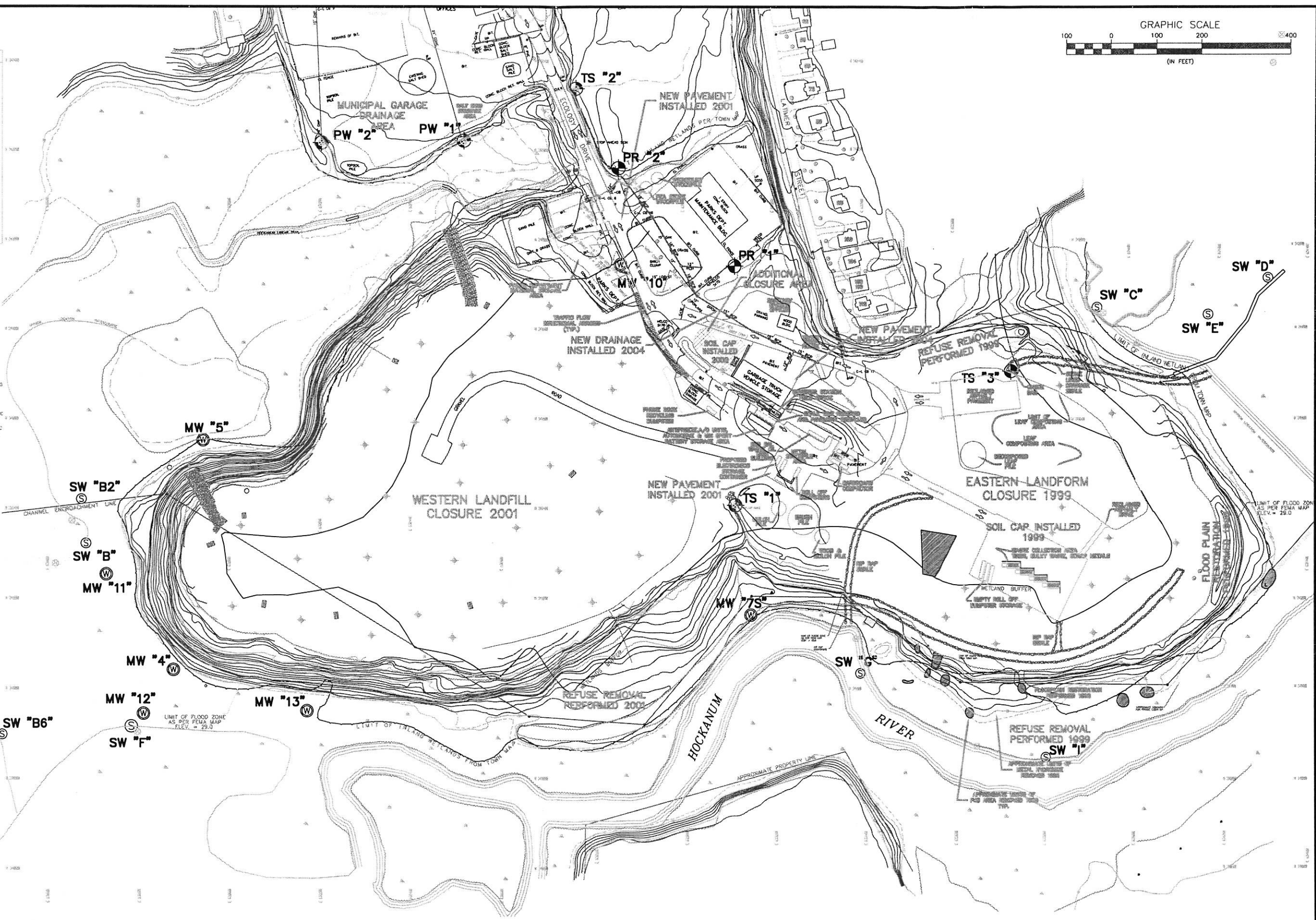


LEGEND

	DRAINAGE DITCH
	QUARTERLY MONITORING WELL SAMPLING POINT
	QUARTERLY STORMWATER SAMPLING POINT
	QUARTERLY SURFACE WATER SAMPLING POINT
	WETLAND BUFFER
	EXISTING CONTOUR
	EXISTING GUT FENCE
	EXISTING TRENCH LINE
	SURFACE WATER CLEANUP LIMIT
	KEVA FENCED PLUM LIMIT
	EDGE OF WATER/STREAM BANK
	EXISTING FENCELINE
	HOCKANUM RIVER ENCROACHMENT LINE
	EXISTING PROSPECT LINE
	WETLAND BUFFER

SURVEY INFORMATION/HISTORY:

1. BASIC MAPPING COMPILED FROM PHOTOGRAPHY DATED 4/28/94
2. PHOTOGRAMMETRY BY JAMES R. SERRAL COMPANY.
3. CONTROL SURVEY AND ELEV BY SHENO C. SHYPPA & ASSOCIATES
4. 100 FOOT GRID BASED ON CHANGINGOUT COORDINATE SYSTEM (MDD 77)
5. VERTICAL DATUM BASED ON NAVD 1928
6. UNDERGROUND FACILITIES AS SHOWN ARE BASED ON LIMITED FIELD INVESTIGATION AND AVAILABLE DATA PROVIDED BY OTHERS. LOCATIONS ARE APPROXIMATE ONLY AND SOME FACILITIES MAY NOT BE SHOWN
7. PROPERTY LINES ARE BASED UPON VARIOUS MAPS ON FILE IN THE TOWN OF EAST HARTFORD ENGINEERING DEPARTMENT. IT IS NOT TO BE CONSTRUED AS HAVING BEEN OBTAINED AS THE RESULT OF A FIELD SURVEY, AND IS SUBJECT TO SUCH CHANGE AS AN ACCURATE BOUNDARY SURVEY MAY DISCLOSE.
8. AS-BUILT SURVEY INFORMATION ON THE CONSTRUCTION OF THE EASTERN LANDFORM AND THE TRANSFER STATION WAS SUPPLIED BY ANCHOR ENGINEERING SERVICES INC. DATED 01/03/00. AS BUILT SURVEY INFORMATION ON THE WESTERN LANDFORM WAS SUPPLIED BY BOUNDARIES, LLC DATED 12/04/01
9. AS-BUILT INFORMATION FOR THE ADDITIONAL CLOSURE AREA OFF ECOLOGY DRIVE WAS SUPPLIED BY THE CT EAST HARTFORD ENGINEERING DEPARTMENT.
10. LANDFILL CLOSURE AS-BUILT PLUM WAS PROVIDED BY STEARNS & WHEELER, LLC ENVIRONMENTAL ENGINEERS & SCIENTISTS, DATED 10/02; LAST REVISED 11/02; JOB NO. 00168



NOTES:
 Underground facilities, structures, and utilities have been plotted from available surveys and records, and therefore their locations must be considered approximate only. There may be others, the existence of which is presently not known. Anyone using utility information and data provided herein shall "Call before you dig" at 1-800-922-4455 forty eight (48) hours in advance to verify the location of utilities prior to start of construction.

MAP NOTES:
 This plan was compiled from other maps, record research or other sources of information. It is not to be construed as having been obtained as the result of a field survey, and is subject to such change as an accurate field survey may disclose. Existing base mapping was provided by Stearns and Wheeler, LLC. See notes 1 thru 10 above. Modifications were made to the existing plan to reflect changes to date for planimetric purposes only.

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NO.	DATE	DESCRIPTION	BY

TOWN OF EAST HARTFORD
POST-CLOSURE LANDFILL MONITORING / STORMWATER OUTFALL SAMPLING LOCATIONS
GENERAL PERMIT for the DISCHARGE of STORMWATER ASSOCIATED WITH INDUSTRIAL ACTIVITY.

DATE: 2/28/2006 DRAWN BY: AWT SHEET: 1 / 1