

Mr. Dan Bailey
Pierce Atwood LLP
100 Summer Street
Boston, MA 02110

April 27, 2018
File No. 4376.00

Re: Preliminary Soil Pre-Characterization and Opinion of Cost
Proposed Off-Site Disposal of Soil
277-283 Washington Street
Westwood, MA

Dear Dan:

Sanborn, Head & Associates, Inc. (Sanborn Head) has completed a preliminary soil pre-characterization program and prepared this Opinion of Cost for off-site disposal of soil proposed to be excavated in support of the proposed library and municipal building project at 277-283 Washington Street in Westwood, Massachusetts. We understand that a multi-property land swap and redevelopment is being considered by the Town of Westwood that would include relocation of the Town library structure and the construction of a new adjoining municipal building both with one-level below grade basements. This Opinion of Cost includes the following supporting documents:

- **Figure 1 – Exploration Location Plan.** Shows the approximate location of the proposed building based on a proposed layout plan provided by GCG Associates, Inc. (GCG) as well as the borings advanced for the collection of analytical soil samples.
- **Table 1 – Summary of Soil Analytical Data.** Provides the analytical results for the preliminary soil pre-characterization samples collected during the drilling program performed on April 16, 2018.
- **Table 2 – Opinion of Soil Transportation and Disposal (T&D) Cost.** Identifies the assumed area of the proposed building and depth of excavation, the resulting estimated volume (in cubic yards) and weight of soil (in tons) expected to be shipped off-site for disposal, the estimated quantities of different soil quality classifications based on the analytical data collected on April 16, 2018, and estimated transportation and disposal costs.
- **Attachment A – Opinion of Cost Assumptions.** This narrative provides additional detail regarding the assumptions made for this Opinion of Cost.

As shown on Table 2 and based on the assumptions noted herein, the total volume of material assumed to be displaced by the below grade structure and utility construction is estimated to be approximately 2,100 cubic yards, which corresponds to a weight of soil of about 3,400 tons. Our opinion of the cost for off-site transportation and disposal (T&D) is approximately \$94,000.

We strongly recommend that an assumed contingency be applied to this estimate due to the uncertainty of variable subsurface conditions that may not be identified until the site is excavated and fluctuating market factors (supply and demand) related to availability of airspace and disposal costs at permitted disposal facilities at the time of construction. We recommend a contingency of 25% to account for these variables. As such, soil disposal costs could range up to \$118,000.

We believe that the greatest potential uncertainty with respect to the potential soil T&D cost exists in the cost of disposal airspace. However, we also believe that market factors will continue to drive permitting of new disposal facilities to meet demand. Based on our review of the available data and our experience, it is our opinion that there is less risk of uncertainty regarding the types of soil and the extent of potential environmental impact to be encountered during excavation.

In addition, the potential exists to re-use some of this Group A material within the Town of Westwood, on Westwood-owned land, if the so-called "anti-degradation" requirements of the Massachusetts Contingency Plan (MCP), 310 CMR 40.0032(3), as further detailed the Massachusetts Department of Environmental Protection (DEP) policy WSC#-13-500 (Similar Soils Provision Guidance, dated September 4, 2014) can be met.

It should also be noted that additional analytical samples may be required by prospective disposal facilities just prior to construction due to the age of the existing analytical data at the time of construction (e.g., some facilities do not accept soil pre-characterization data older than one year) and the potential sampling frequency requirements of the operating permits for the disposal facilities.

Lastly, one slight exceedance of a Reportable Concentration (RC) was identified in the fill soil at location SH-5. Benzo(a)pyrene was identified at 2.2 mg/kg, in excess of the RCS-1 standard of 2 mg/kg. Polycyclic aromatic hydrocarbons (PAHs) such as this are commonly identified in fill soils in Massachusetts associated with historical combustion related compounds (coal and wood ash). As such, this sample has been submitted to a microscopy laboratory to determine if coal, coal ash, or wood ash is present in the sample to support exempting the detection from reporting as a 120-day condition to DEP under the MCP per 310 CMR 40.0317(9). We anticipate obtaining these results within 7 to 10 days.

If you have any questions, please do not hesitate to call us at (978) 392-0900.

Very truly yours,
Sanborn, Head & Associates, Inc.



Laura J. Garvey, P.E., LSP
Senior Project Manager



Mathew P. Heil, P.E., LSP
Project Director

LJG/MPH: ljj

Enclosures: Figure 1 – Exploration Location Plan
Table 1 – Summary of Soil Analytical Data
Table 2 – Opinion of Soil Transportation and Disposal Cost
Attachment A – Opinion of Cost Assumptions


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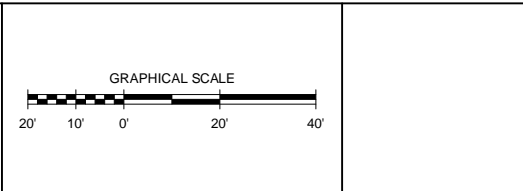
DATE: 4-18-2018 2:27PM
C:\PROJECTS\277-283 WASHINGTON STREET\DWG\277-283 WASHINGTON STREET EXPLORATION LOCATION PLAN.dwg
PLOT FILE: 277-283 WASHINGTON STREET EXPLORATION LOCATION PLAN.dwg
SCALE: 1/8" = 1'-0"
DRAWN BY: C. GREEN
DESIGNED BY: L. GARVEY
REVIEWED BY: M. HEIL
PROJECT MGR: L. GARVEY
PIC: M. HEIL
DATE: APRIL 2018
SHEET NUMBER: 1
PROJECT NUMBER: 4376.00
OPINION OF COST
277-283 WASHINGTON STREET
WESTWOOD, MASSACHUSETTS
EXPLORATION LOCATION PLAN



- NOTES:**
1. THE BASE MAP WAS DRAWN FROM A PLAN ENTITLED, "EXISTING CONDITIONS SITE PLAN", PREPARED BY GCG ASSOCIATES, INC. (GCG) OF WILMINGTON, MA, DATED DECEMBER 12, 2017 WITH AN ORIGINAL SCALE OF 1" = 20'.
 2. THE PROPOSED SITE FEATURES WERE TAKEN FROM AN ELECTRONIC PLAN ENTITLED, "PROPOSE LAYOUT SITE PLAN", PREPARED BY GCG, DATED DECEMBER 12, 2017 WITH AN ORIGINAL SCALE OF 1" = 20'.
 3. EXPLORATIONS DESIGNATED SH-1 THROUGH SH-6 WERE ADVANCED BY G&M SUBSURFACE, LLC OF DIGHTON, MA AND OBSERVED BY SANBORN HEAD ON APRIL 16, 2018.
 4. APPROXIMATE LOCATIONS OF EXPLORATIONS ARE BASED ON TAPED MEASUREMENTS MADE IN THE FIELD RELATIVE TO PROMINENT SITE FEATURES. THIS DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

LEGEND:

SH-1  APPROXIMATE LOCATION AND DESIGNATION OF SOIL BORING OBSERVED BY SANBORN HEAD (APRIL 2018)



NO.	DATE	DESCRIPTION	BY

DRAWN BY: C. GREEN
DESIGNED BY: L. GARVEY
REVIEWED BY: M. HEIL
PROJECT MGR: L. GARVEY
PIC: M. HEIL
DATE: APRIL 2018

OPINION OF COST
277-283 WASHINGTON STREET
WESTWOOD, MASSACHUSETTS
EXPLORATION LOCATION PLAN

PROJECT NUMBER:
4376.00

SHEET NUMBER:
1

TABLE 1
Summary of Soil Analytical Data
277-283 Washington Street
Westwood, MA

LOCATION	MA Unlined Landfill/Reuse Criteria	MA Lined Landfill/Reuse Criteria	MCP RCS-1 Criteria	Units	SH-1/2C/6-10 4/16/2018 Natural	SH-2/3A/10-13 4/16/2018 Natural	SH-3/2B/6-10 4/16/2018 Natural	SH-4/2A/5-7 4/16/2018 Natural	SH-5/1A/0-5 4/16/2018 FILL
SAMPLING DATE					A-1	A-2	A-1	A-2	B-1
SAMPLE TYPE									
DISPOSAL CLASSIFICATION									
General Chemistry									
Specific Conductance @ 25 C	4000	8000	NS	umhos/cm	29	32	11	19	65
Solids, Total	NS	NS	NS	%	96.6	97.2	93.3	89.6	88.5
pH (H)	2 to 12.5	2 to 12.5	NS	SU	8.1	8.5	8.1	7.8	6.6
Cyanide, Reactive	250	250	NS	mg/kg	<10	<10	<10	<10	<10
Sulfide, Reactive	500	500	NS	mg/kg	<10	<10	<10	<10	<10
Ignitability of Solids									
Ignitability	>140/NI	>140/NI	NS	°F	NI	NI	NI	NI	NI
MCP Polychlorinated Biphenyls									
PCBs, Total	<2	<2	1	mg/kg	<0.0326	<0.0323	<0.0343	<0.0359	<0.0363
MCP Semivolatile Organics									
Fluoranthene	NS	NS	1000	mg/kg	<0.1	0.18	<0.11	0.58	4.2
Bis(2-ethylhexyl)phthalate	NS	NS	90	mg/kg	<0.17	0.18	<0.18	0.24	<0.19
Benzo(a)anthracene	NS	NS	7	mg/kg	<0.1	0.12	<0.11	0.27	1.8
Benzo(a)pyrene	NS	NS	2	mg/kg	<0.13	0.14	<0.14	0.32	2.2
Benzo(b)fluoranthene	NS	NS	7	mg/kg	<0.1	0.2	<0.11	0.45	3.2
Benzo(k)fluoranthene	NS	NS	70	mg/kg	<0.1	<0.1	<0.11	0.12	0.81
Chrysene	NS	NS	70	mg/kg	<0.1	0.13	<0.11	0.33	1.9
Acenaphthylene	NS	NS	1	mg/kg	<0.13	<0.14	<0.14	<0.14	0.24
Anthracene	NS	NS	1000	mg/kg	<0.1	<0.1	<0.11	<0.11	0.58
Benzo(ghi)perylene	NS	NS	1000	mg/kg	<0.13	<0.14	<0.14	0.22	1.7
Phenanthrene	NS	NS	10	mg/kg	<0.1	<0.1	<0.11	0.28	2.3
Dibenzo(a,h)anthracene	NS	NS	0.7	mg/kg	<0.1	<0.1	<0.11	<0.11	0.34
Indeno(1,2,3-cd)pyrene	NS	NS	7	mg/kg	<0.13	<0.14	<0.14	0.24	1.5
Pyrene	NS	NS	1000	mg/kg	<0.1	0.17	<0.11	0.53	3.6
Total SVOCs	100	100	NS	mg/kg	BDL	1.12	BDL	3.58	24.37
MCP Total Metals									
Antimony, Total	NS	NS	20	mg/kg	<1.97	<2	<2.05	<2.18	<2.16
Arsenic, Total	40	40	20	mg/kg	<0.394	<0.399	<0.41	1.32	<0.432
Barium, Total	NS	NS	1000	mg/kg	14.8	11.8	5.99	18.2	20.5
Beryllium, Total	NS	NS	90	mg/kg	<0.197	<0.2	<0.205	<0.218	<0.216
Cadmium, Total	30	80	70	mg/kg	<0.394	<0.399	<0.41	<0.435	<0.432
Chromium, Total	1000	1000	100	mg/kg	12.5	4.4	1.86	7.47	4.05
Lead, Total	1000	2000	200	mg/kg	4.61	3.43	6.44	23.9	32.3
Mercury, Total	10	10	20	mg/kg	<0.065	<0.067	<0.069	<0.07	0.24
Nickel, Total	NS	NS	600	mg/kg	8.63	1.64	2.16	5.06	3.44
Selenium, Total	NS	NS	400	mg/kg	<1.97	<2	<2.05	<2.18	<2.16
Silver, Total	NS	NS	100	mg/kg	<0.394	<0.399	<0.41	<0.435	<0.432
Thallium, Total	NS	NS	8	mg/kg	<1.97	<2	<2.05	<2.18	<2.16
Vanadium, Total	NS	NS	400	mg/kg	7.44	2.63	3.17	12.6	5.59
Zinc, Total	NS	NS	1000	mg/kg	44	13.4	20.2	27.5	25.5
MCP Volatile Organics by 8260/5035									
Total VOCs	4	10	Varies	mg/kg	BDL	BDL	BDL	BDL	BDL
Petroleum Hydrocarbon Quantitation									
TPH	2500	5000	1000	mg/kg	<33.5	360	<35.6	752	900

Notes:

1. The soil samples were collected by Sanborn Head & Associates, Inc. (Sanborn Head) on the indicated date and was analyzed by Alpha Analytical, Inc. of Westborough, MA.

2. Bolded values indicate the analyte was detected above laboratory reporting limits. The soil samples are compared to the Massachusetts Contingency Plan (MCP) Reportable Concentrations for S-1 soil (RCS-1). Shaded values exceed the MCP RCS-1 standards.

3. Massachusetts landfill criteria were taken from Table 1 of the Department of Environmental Protection (DEP) Policy #COMM-97-01, "Reuse and Disposal of Contaminated Soil at Massachusetts Landfills."

5. VOCs were not detected above the laboratory reporting limit are shown. For a complete list of analytes, refer to the analytical laboratory reports.

6. Abbreviations:

BDL = Below Detection Limit

VOC = Volatile Organic Compound

SVOC = Semi-Volatile Organic Compound

TPH = Total Petroleum Hydrocarbon

PCBs = Polychlorinated Biphenyls

"<" indicates the analyte was not detected above the laboratory reporting limit shown

"NA" = not applicable

"NI" = not ignitable

"NS" = no standard

"mg/kg" = milligrams per kilogram

7. Soil disposal classifications are defined in Table 2.

TABLE 2
Opinion of Soil Transportation and Disposal Cost
277-283 Washington Street
Westwood, MA

Grade Footprint	Soil Depths (ft)	Thickness (ft)	Soil Type	Soil Volume (C.Y)	Soil Weight (tons)	Volume of Soil by Classification (tons)			Disposal Cost (\$)
						A-1	A-2	B-1	
						\$25/ton	\$25/ton	\$34/ton	
4,000	0-4'	4	Fill	593	948			948	\$ 32,300.00
	4-12'	8	Natural	1185	1896	948	948		\$ 47,500.00
Utilities and Foundations	Assume 20% contingency		Natural	356	569		569		\$ 14,300.00
Total				2133	3413	948	1517	948	\$ 94,100.00
Contingency (25%)									\$ 23,600.00
Total with Contingency									\$ 117,700.00

NOTES:

1. Disposal Classification is categorized into four main groups for the purpose of off-site disposal or treatment according to guidance criteria indicated in the DEP policies COMM-97-01 and WSC-94-4000 for reuse at lined and unlined landfills and acceptability at soil recycling facilities.

Classifications are as follows:

Group A-1 = Naturally deposited soils that contain no detectable levels of oil (<25 ppm), waste oil or hazardous materials other than naturally occurring metals.

Group A-2 = Naturally deposited soils that contain oil, waste oil or hazardous materials at concentrations less than a release notification threshold equal to RCS-1 specified in 310 CMR 40.0361 and that are not otherwise a hazardous waste, as specified in DEP policy.

Group A-3 = Urban fill soils that contain oil, waste oil or hazardous materials at concentrations less than a release notification threshold equal to RC S-1 specified in 310 CMR 40.0361 and that are not otherwise a hazardous waste, as specified in DEP policy.

Group B-1 = Material that exceeds RC S-1 notification criteria and which meets COMM-97-001 criteria for disposal at in-state **unlined landfills** to be reused as daily cover, intermediate cover and pre-cap contouring material. This material may be transported off-site under a Bill-of-Lading process to a DEP-approved landfill facility.

Group B-2 = Material that exceeds RC S-1 notification criteria and which meets COMM-97-001 criteria for disposal at in-state **lined landfill** facilities to be reused as daily cover, intermediate cover and pre-cap contouring material. This material may be transported off-site under a Bill-of-Lading process to a DEP-approved landfill facility.

Group B-3 = Material that meets the WSC-94-400 criteria for in-state recycling or thermal treatment and/or the specific licensing requirements for **in-state recycling**. This material may be transported off-site to a DEP-approved recycling or treatment facility under a Bill-of-Lading.

Group B-4 = Material which contains concentrations of contaminants that exceed lined and unlined landfill reuse as well as in-state recycling acceptance criteria, but meet the criteria for regional thermal treatment facilities or out-of-state recycling facilities. The materials must be transported to a state permitted thermal treatment or recycling facility under a Bill-of-Lading or Uniform Hazardous Waste Manifest.

Group B-5 = RCRA non-hazardous waste material which contains concentrations of contaminants that require shipment under a Uniform Hazardous Waste Manifest to regional recycling, thermal treatment facilities, or out-of-state permitted disposal facilities.

Group C = Material that meets specific "listed" or "characteristic" criteria defined in 310 CMR 30.000, the "Massachusetts Hazardous Waste Regulations". Material determined to contain "listed" or "characteristic" hazardous waste constituents will require removal and disposal at an **out-of-state approved RCRA Subtitle C hazardous waste disposal** or treatment facility.

2. See Attachment A for the assumptions made for this Opinion of Cost.

ATTACHMENT A

OPINION OF COST ASSUMPTIONS OFF-SITE TRANSPORT AND DISPOSAL OF EXCAVATED SOIL 277-283 WASHINGTON STREET, WESTWOOD, MA

Sanborn, Head & Associates, Inc. (Sanborn Head) has prepared an Opinion of Cost for off-site transportation and disposal (T&D) of soil to be excavated from the proposed basement area, foundation elements, and utility trenches for the proposed library and municipal building project at 277-283 Washington Street in Westwood, MA. This attachment outlines assumptions made for the Opinion of Cost.

For the purpose of this cost opinion, we understand that the proposed building has a footprint of approximately 4,000 square feet and that the excavation for the basement is anticipated to extend to approximately 12 feet below ground surface (bgs). This represents an approximate soil volume of approximately 1,778 cubic yards (CY). We also assumed that an additional 20% of this volume (356 CY) would need to be excavated for utilities and foundation elements for a total of 2,133 CY.

To provide an Opinion of Cost for off-site soil disposal, Sanborn Head collected five preliminary soil pre-characterization samples representative of the fill and natural soil in the vicinity of the proposed building. The samples collected by Sanborn Head were submitted for a pre-characterization suite of analyses including those outlined in DEP Policy COMM-97-001: *Reuse and Disposal of Contaminated Soil at Massachusetts Landfills*, dated August 15, 1997. Specifically, the samples were submitted for analysis of: MCP 14 metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), total petroleum hydrocarbons (TPH), ignitability, specific conductance, pH, and reactivity. The laboratory analyses were performed by Alpha Analytical, Inc. (Alpha) of Westborough, Massachusetts.

The sampling locations were chosen based on the approximate footprint of the currently proposed building. However, the locations required some adjustment in the field due to site constraints including overhead wires and subsurface utilities. Nonetheless, it is our opinion that the sampling locations adequately represent the soil proposed for excavation for the purpose of this preliminary soil pre-characterization and opinion of cost effort.

The soil analytical data was reviewed and based on the data, the samples were divided into Soil Disposal Classifications in accordance with DEP policies COMM-97-01, WSC-94-4000 and WSC-13-500 for reuse at lined and unlined landfills, acceptability at soil recycling facilities, and reuse at Similar Soils facilities. To convert soil volume in cubic yards to soil weight in tons, we assumed a soil unit weight of 1.6 tons/CY.

Total transportation and disposal costs were estimated based on the calculated soil volumes and Disposal Classifications. Unit rate costs are based on our understanding of the typical current market rates based on similar projects in the area and discussions with disposal facilities. We note that the soil disposal market has been somewhat volatile and is

anticipated to remain so for the foreseeable future. Facilities are opening and closing on a regular basis with availability and pricing varying accordingly.

It should be noted that additional analytical data may be required by prospective disposal facilities just prior to construction to meet the requirements of the operating permits for the disposal facilities. Further, additional samples may also be required depending upon the timing of the project since some facilities have limitations regarding the allowable age of soil pre-characterization data (e.g., data older than 1 year typically requires updated sampling prior to approval). The attached Table 2 summarizes the Opinion of Cost calculations for the subsurface excavation.

Please note that this Opinion of Cost is limited to the potential costs associated with off-site T&D of soil. Therefore, this Opinion of Cost does not include other potential earthwork related costs such as bedrock excavation, if encountered, or groundwater dewatering and treatment, if needed. Lastly, this Opinion of Cost does not include preparation of LSP Opinion/soil disposal application packages required by the disposal facilities prior to acceptance.

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