FINAL Report

Evaluation of Potential Post-Closure Uses

Concord Avenue Landfill Site

Draft for Client Review of FINAL REPORT

Prepared for
Town of Belmont, Massachusetts

March 2017

CDM Smith

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Section 1
Introduction

1.1 Purpose

The Town of Belmont (Town) is required by the Solid Waste Management Regulations (310 CMR 19.000) promulgated by the Massachusetts Department of Environmental Protection (MassDEP) to cap and close the Concord Avenue Landfill (Site). The Site is currently actively used for several activities including the storage and processing of materials generated by a variety of municipal operations.

Over the past several years, the Town has evaluated a variety of potential uses of the Site once the MassDEP capping requirements are met. The intent of this report is to provide a summary of the prior uses evaluated and to augment the Town's process of selecting a final use by evaluating additional post-closure use alternatives identified by the Town. These new and revised alternatives also provide for the opportunity for the Town to offer a portion of the Site to private entities for a revenue-generating development.

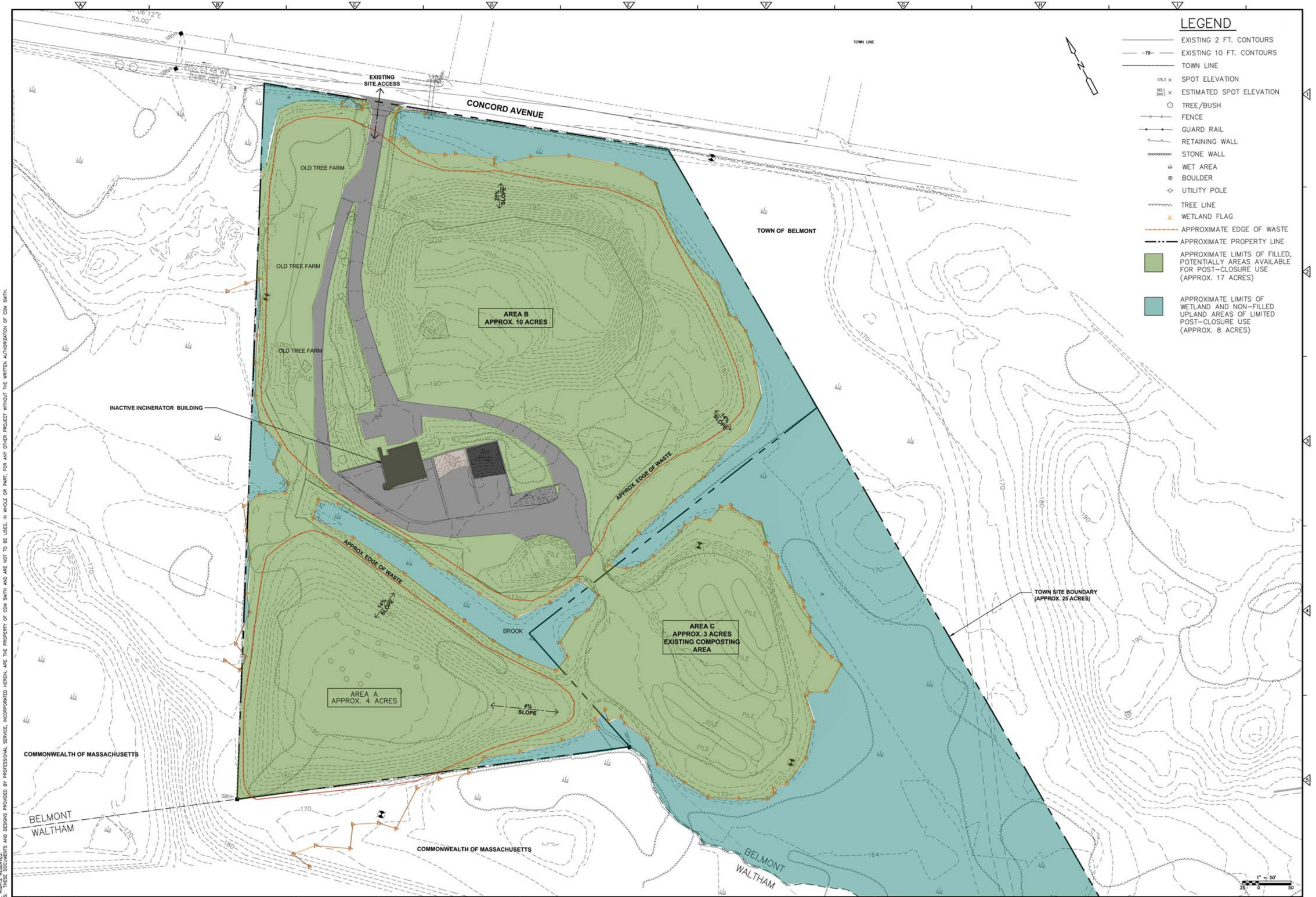
1.2 Site Description

The overall Site encompasses approximately 25 acres with the historically landfilled portions comprised of three areas totaling approximately 17 acres that are separated by wetland resource areas. The remaining 8-acres of the Site are predominantly wetlands that, because of regulatory restrictions, are not available for long-term development or active use. The historically landfilled areas; designated Area A, B and C; are shown on the attached Figure 1-1. The acreage, ownership status and current use of each of the historically filled areas is summarized in Table 1-1 below.

Table 1-1
Summary of Previously Filled Upland Areas Available for Use

Area	*Upland Developable Area (Acres)*	*Final Cap Status (See Notes 1 and 2)*	*Ownership Status*	*Current Use*
A	4	Existing soil cap over entire filled area to be utilized	Transfer to Town via Legislation	None
B	10	Requires new cap meeting current MassDEP standards.	Transfer to Town via Legislation	Inactive Incinerator Building Public Works storage
C	3	Not historically landfilled – Assumed no cap required	Owned by Town	Town Leaf and Yard Waste Composting

1. Final cap status is based on initial submittals made to MassDEP and requires their final approval in accordance with the Solid Waste Management Regulations (310 CMR 19.000).
2. MassDEP has allowed alternative caps including 3-foot thick soil cap and pavement. Selection of final cap will be based on cost and compatibility with selected post-closure use.



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CONCORD AVENUE

BELMONT, MASSACHUSETTS

EXISTING CONDITIONS PLAN

PROJECT NO. 19316-66833
FILE NAME: EXST001

SHEET NO.
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The Site is comprised of two separate property parcels. One parcel totaling approximately 9.5 acres includes Area C is owned by the Town and is potentially available for development by a private firm under either a lease or outright purchase. The second parcel is the subject of recent legislation (House Bill Number 2869) that outlines a process where the Town will obtain ownership title to the property from the Commonwealth. In addition to outlining the transfer process, the legislation restricts the future use of the parcel for "…recreation, public works or other municipal uses." Approximately 8 of the 25 total acres that comprise the two parcels have been delineated as a wetland resource area and will not have any development opportunities outside of passive recreation and buffer.

An inactive incinerator building currently occupies the southern portion of Area B. The ash historically generated by the incinerator was the primary waste landfilled in Areas A and B. Preliminary specifications for the demolition of the incinerator building including required abatement activities has been prepared and the work will be completed once the Town owns the property. Recently, the central section of Area B has been used for the placement of soils and other materials in preparation to provide grading soils to construct a plateau for a proposed post-closure use.

The landfilled areas have significant slopes that will need to be regarded to create the flatter plateaus required for active post-closure uses such as those being considered by the Town. The regraded slopes along with buffers from wetland resource areas will decrease the usable areas beyond those indicated in Table 1-1.

Site access is currently directly off Concord Avenue onto the northwestern corner of Area B. Areas A and C are accessed by a single driveway that crosses the stream that bi-sects them from Area B.

1.3 Post-Closure Use of Other Landfill Sites

Since MassDEP updated the Solid Waste Management Regulations in the early 1990's, many Massachusetts communities have been required to construct a final cap on their inactive landfill sites. Post-closure uses of these capped landfills are typically constructed concurrent with the MassDEP-required capping construction project. A sample of the projects where active uses of capped landfills have been implemented in Massachusetts is provided on Table 1-2.

1.4 Considerations with Post-Closure Use of Landfill Sites

The selection of a final post-closure use for a landfill site has many of the same considerations as the development or use of any municipally-owned property. The use has to be compatible with the surrounding land uses and neighborhoods, can be constructed in an aesthetically appropriate manner, meet local permitting requirements and any off-site impacts such as traffic have to be mitigated. Multiple uses of a single landfill site can be designed to incorporate buffers, fences and other features so that the differing uses are compatible.

Table 1-2
Representative Post-Closure Uses of Capped Landfill Sites in Massachusetts

Municipality	*Site Name*	*Post-Closure Use*
Brookline	Front Landfill	Recreational field, passive recreation
	Back Landfill	Public works operational area
Cambridge	Danehy Park	Recreational Field Complex
Boston	Millennium Park (Gardner Street Landfill)	Recreational Field Complex
Boston	Pope John Paul II Park (Hallet Street Landfill)	Recreational complex including walking trails
Newton	Rumford Avenue Landfill	Public Work Operational Area- storage, stockpiling and processing. Leaf composting and residential recycling drop-off
Easton	Prospect Street Landfill	Solar Photovoltaic Array
Lexington	Hartwell Avenue Landfill	DPW Stockpiling, Storage and Processing Regional Leaf and Yard Waste Composting Regional Household Hazardous Waste Facility Emergency Management Operations Area
North Attleborough	North Attleborough Landfill	Residential Drop-off Transfer Station

There are several specific design aspects to be considered when constructing a post-closure use on an older inactive landfill site. Some of the more significant ones and their potential considerations on the selection of a post-closure use at the Site include:

- **Settlement and Foundations.** Because of the nature of solid waste, old landfills will have a significant potential to settle and subside significant amounts – as much as 20% of their initial thickness. In addition to the natural decomposition of waste in a landfill, older landfilling operations did not place the waste in a compacted manner or with an adequate amount of cover material. Any significant structure, including utilities and retaining walls, constructed on an old landfill site will likely typically supplemental foundation support such as piles.

  The landfilled portions of the Site are generally ash with some pockets of by-pass waste (e.g. solid waste that was landfilled directly when the incinerator was not operating or was bulky and could not be incinerated) or forestry materials including stumps. Therefore, it is likely that the landfilled mass at the Site is relatively well consolidated in comparison to the typical older municipal solid waste landfill. However, for purposes of this analysis, the Town should assume that any building or larger structure constructed on the landfilled areas will require additional foundations such as piles. The specific foundation requirements will need to be confirmed once a preferred post-closure use is selected.

- **Public Health and Safety Considerations.** The communities that have implemented a post-closure use of their landfill have had to demonstrate to MassDEP and the community that the proposed use is safe for public use. This work has developed a database of information on the

potential impacts as well as the required long-term monitoring. On the Belmont Site, most of the landfilled waste was incinerator ash that can be effectively isolated from the public by use of an appropriate cap like the one required by the MassDEP's regulations. Given the Site's history and the environmental assessments conducted to date, CDM Smith does not anticipate any significant issue addressing this consideration.

As required by MassDEP regulations, the Town has completed a Comprehensive Site Assessment (CSA) to determine: (1) if the Site has any impact on human health, safety and the environment; and (2) determine if an alternative cap is appropriate for the final cover at the Site. This assessment has been completed with the only remaining issues required by MassDEP to be addressed is further sampling and evaluation of the nearby wetland resources. This remaining work should not impact the Town's selection of a post-closure use.

- **Utilities.** Several of the post-closure uses being evaluated require electrical, water and wastewater connections. The location of these underground utilities needs to be determined so that a clean corridor can be constructed that connects to the Town-owned utilities on Concord Avenue.

- **Preservation of Existing Cap and Integration of Post-Closure Use with the Final Cap.** The final cap typically used for older landfills is shown schematically on Figure 1-2. This cap includes an impermeable liner layer sandwiched between coarse sand to both protect it and to allow drainage to move away from it. Any active post-closure use selected at the Site will have to accommodate the MassDEP regulatory requirements including minimum slopes and allowance for drainage. Some uses, such as recreational fields, are readily adaptable to the standard cap. MassDEP has allowed other alternative caps including pavement and a soil cap on some older landfills. The use of these alternatives is based on the result of the environmental assessment.

  The MassDEP regulations require all caps to be a maximum slope of 3 horizontal to 1 vertical (33%) and a minimum slope of 20 horizontal to 1 vertical (5%). On the Belmont Site, the maximum slope will determine the available flat plateau area for development. Typically, post-closure uses such as fields have flatter slopes than 5% that require either a variance form MassDEP regulations or additional fill to flatten the finished surface over the sloped cap. This additional fill will add development costs for these types of uses compared to their development on a non-landfill site.

  In the early 1980's, the Town implemented a cap consisting of a clay cap over portions of the Site. During the environmental assessment, CDM Smith conducted an evaluation of the existing clay cap and found it to exist over certain portions of the Site. MassDEP has indicated that based on the results of the environmental assessment, the clay cap can be considered the final cap for portions of the Site where it has been adequately demonstrated to exist. This clay cap may also be adequate for several of the potential post-closure uses but may be required to be repaired or replaced if certain alternatives are selected. A significant repair or replacement of this cap will increase the costs for the final cap at the Site.

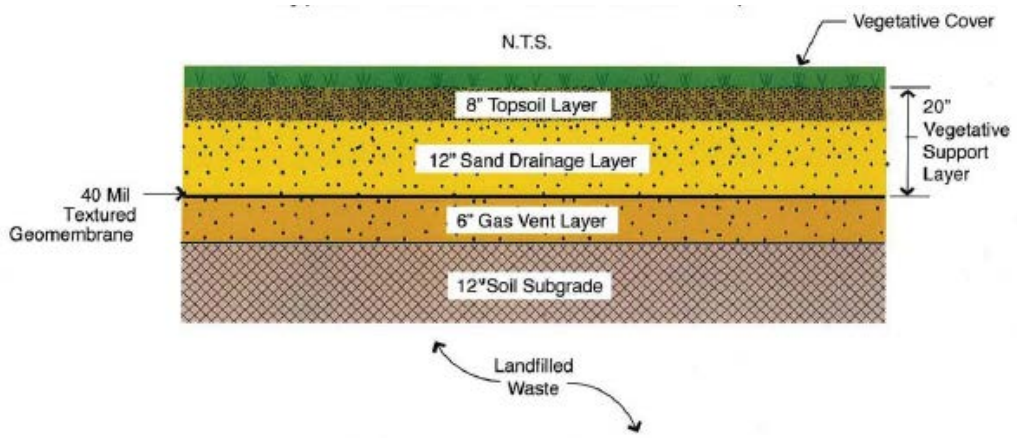

Figure 1-2
Typical MassDEP Required Landfill Cap Cross-Section

- **Stormwater.** The MassDEP solid waste and wetlands protection regulations have specific requirements related to the design of the stormwater system around a capped landfill. Since the typical capped landfill is a vegetated surface, these requirements are typically easily incorporated into the design. The post-closure use of a landfill often includes impervious areas for parking or artificial fields with enhanced drainage systems that require subsurface drainage structures such as catch basins and associated piping that have to be constructed around the cap. It should also be noted that the one of the purposes of a final cap is to minimize infiltration of water into the underlying waste mass. Therefore, drainage structures that either infiltrate stormwater or allow it to be retained for an extended time either could not be permitted or will require additional cap components to be implemented.

1.4 Post-Closure Use Regulatory Considerations

The capping of older landfill sites is a highly-regulated activity with requirements to obtain several permits and approvals from MassDEP and potentially other regulatory agencies. The addition of a post-closure use will add requirements related to the selected use. For the closure and potential post-closure use options for the Site, the following permits and approvals need to be considered:

- **MassDEP Solid Waste Management Regulations (310 CMR 19.000).** The closure of the landfill will require the preparation of a Corrective Action Design (CAD) permit application as well as completion of the environmental assessment through the Corrective Action Alternative Analysis (CAAA) process. The addition of a post-closure use will require the Town to also obtain a Major Post-Closure Use Permit under these regulations. The Post-Closure Use Permit requires that the proposed use be demonstrated to be protective of human health, safety and the environment; and be compatible with the regulatory requirements for the final cap.

- **Wetland Resource Related Regulations.** The capping of landfills is a "Limited Project" under the Wetlands Protection Act and its associated regulations that are locally enforced by the Belmont Conservation Commission. The Limited Project designation allows the capping of landfills in wetland resource areas and associated buffer zones without fully meeting the typical requirements for replication and alternative assessment. The Belmont Conservation

Commission has a policy that establishes a 25-foot no-disturbance buffer zone from wetland resource areas. CDM Smith's experience with local Conservation Commissions on landfill closure projects is that they are typically able to meet the requirements of the local Conservation Commission.

In addition to the Wetlands Protection Act regulations, the project may be able to be required to obtain a Water Quality Certification from MassDEP and a Programmatic General Permit from the Army Corps of Engineers if cap construction requires permanent alteration of more than 5,000 square feet of delineated resource area. The need for these permits will be determined during the cap design phase.

The addition of a post-closure use will require the Town to obtain wetland related permits like those required of any other development. The greatest concern is meeting the MassDEP required stormwater design requirements for projects given the limitations imposed by the landfill cap as discussed above.

- **Massachusetts Environmental Policy Act (MEPA, 301 CMR 11.00).** The MEPA regulations establish a series of thresholds where projects need to file either an Environmental Notification Form (ENF) or an Environmental Impact Report (EIR). MEPA is intended to allow the evaluation of alternatives and mitigation measures for large, complicated projects. The thresholds that may impact the closure and post-closure use include temporary and permanent wetland impacts and creating more than 5 acres of impervious area (e.g. pavement and buildings). The requirement of an EIR significantly increases the cost and timelines necessary for project implementation. The current MassDEP requirement to address wetland impacts from the Site may necessitate the completion of an ENF and possibly an EIR.

- **Zoning.** The Site is currently shown as zoned for "Single Residence D" on the Town maps (see appendix D). This zoning designation allows for a minimum lot area of 25,000 sf, minimum lot frontage of 125-feet, 20% maximum lot coverage and 50% minimum open space, with 30-ft front setbacks, 15-ft side setbacks, 25-ft rear setbacks and 36-ft or 2.5 story maximum building height. While municipal uses are allowed within this zoning area, Area C lacks sufficient frontage to be deemed a buildable lot and therefore any private commercial development of Area C will require a variance through the Belmont Zoning Board of Appeals. A variance is not guaranteed. The Belmont Zoning Map, along with Sections 2, 3 and 4 of the current Zoning By-Law are included for reference in Appendix E.

Section 2
Summary of Alternative Post-Closure Uses

2.1 Approach

The past and current work performed by CDM Smith evaluating potential uses of the Concord Avenue Landfill Site will be summarized in this section along with additional potential uses identified by the Town.

Current discussions on the future Site uses have been developed with the following three common considerations:

- Adequate space has to be set aside for continued municipal uses including the storage and processing of various materials collected by the Department of Public Works (DPW). The requirements for these operations are outlined in Section 2.2 below. These operations are all currently done at the Site and there are no alterative location in Town to accommodate them. Appropriate access, security and buffers from other uses from these operations has been incorporated into each alternative.

- All of the currently evaluated uses include the potential for private development of the back parcel (Area C) owned by the Town without any restrictions. To accommodate this potential, the preliminary plans were developed with an appropriate access road to Area C when it could be accommodated.

- Any re-use of Areas A and B on the property currently owned by the Commonwealth is restricted to municipal uses in accordance with the requirements of the legislation.

Based on these general considerations, CDM Smith met with town officials to review historic information on Site uses that were previously evaluated and identify additional Site uses that could be potentially implemented. The additional potential uses are summarized on Table 2-1 and discussed in Section 2.4.

Table 2-1
Summary of Additional and Updated Post-Closure Use Alternatives

Alternative
Relocation of Town Police Station from Current Location
Relocation of DPW Facilities from Current Location
Rectangular Athletic Fields
Two Softball Fields
Single Sheet Municipal Ice Rink

A draft of this report was provided to the Town and public in June 2014 and a public hearing was held as part of a Board of Selectmen meeting on November 3, 2014. A copy of the presentation made at the public hearing is provided in Appendix F and revisions to the draft version of the report have been incorporated into this final version.

2.2 Required Municipal Uses

As discussed in Section 1, there are several existing uses of the Site for required municipal operations that will need to be continued as there are no alternative locations available for them on Town property. These uses include collection and storage of street sweepings, cleanings from catch basins, and excess construction soils removed during the Town's daily operations. These materials need to be consolidated into an adequate volume where it is cost-effective to process them into a reusable product or transport them out-of-town for disposal at a permitted facility.

The municipal uses that are assumed to continue at the Site are summarized on Table 2-2.

Most of these operations can be located on a paved surface with appropriate covers over several of the storage areas and stormwater controls to reduce the impact of run-off from the storage on the adjacent wetland resource areas. Disposal costs for materials such as street sweepings and catch basin cleanings will be minimized if they are allowed to drain and covered to stay dry.

Paved surfaces have been approved by the MassDEP as the final cap over similar public works operations areas in other municipalities. The perimeter of the operations area(s) would be grassed with an appropriate cap as approved by MassDEP.

The Town currently composts leaf and yard waste on Area C. This use utilizes a significant area that cannot continue to be accommodated with the other proposed post-closure uses. Discussions with the DPW staff indicate that the leaf and yard waste composting operations could be privatized to an out-of-town facility to allow for the development of a portion of the site for another use. CDM Smith has allowed for 2 to 3 bins for temporary consolidation of leaf and yard waste along with the potential use of a larger open area for any overflow.

MassDEP policies preclude the disposal of snow over landfills and this continued use will have to be incorporated into the final closure. At this time, CDM Smith has assumed that the former landfilled Area A could be utilized for snow disposal as well as temporary storage of brush and other storm debris. This approach will have to be approved by MassDEP.

2.3 Post-Closure Uses Previously Evaluated

As the Town has worked through the MassDEP required closure process, CDM Smith has been retained to conduct evaluations of several specific post-closure uses for the Site in addition to the municipal uses discussed above. These uses are summarized in the attached Table 2-3 and discussed briefly below. More detailed information on each historically evaluated use is provided in the appendices to this report.

Table 2-2
Summary of Current and Future Municipal Uses at
Concord Avenue Landfill Site, Belmont

Site Current Use	Description	Assumed Future Use	Number of Bins Required (Note)
Leaf and Yard Waste Composting	Currently occupies most of Area C	Composting on-site will cease. Leaf and yard waste to be consolidated on-site and hauled to regional compost site	2 to 3
General construction material storage	Storage of pipes, etc. required for construction performed by Town crews	Provide bins for storage of different types of pipes, drainage structures, etc.	2
Storage of Excess Construction Soils	Excess construction soils stored from DPW construction operations	Provide bins to consolidate adequate quantity of soils for either off-site disposal or re-use in Town projects.	1 to 2
Contractor staging area	Staging for trailers, equipment and materials for municipal construction projects	Need to provide limited area for construction contractors hired by Town to store materials and equipment.	N/A
Emergency Snow Disposal Area	Conducted at Site when required for safety on public roadways	Need to provide open space with appropriate drainage controls for emergency snow disposal.	N/A
Temporary storage of appliances for recycling	Residential recycling of appliances stored	Provide separate bin areas for appliances containing CFC's and non-CFC's	2
Storage of utility poles by Belmont Light	Currently stored on western side of Area B	Provide continued open storage area	N/A
Temporary tree and brush storage area	Currently stored on western side of Area B	Require bin(s) for storage of tree and brush materials prior to chipping. Separate storage in bin for wood chips	1
Asphalt and concrete temporary storage and recycling area. Storage of finished product.	Currently stored in bin areas south of incinerator building.	Provide bin areas for unprocessed asphalt and concrete (from sidewalks) and bin areas for processed materials to be reused by Town.	3
Temporary street sweeping storage with out-of-town disposal	Conducted on Area B	Require covered bin with appropriate drainage for liquids to store street sweepings prior to hauling off-site for disposal.	1
Temporary catch basin cleaning storage with out-of-town disposal	Conducted on Area B	Require covered bin with appropriate drainage for liquids to store catch basin and other drainage cleanings prior to hauling off-site for disposal.	1

Note: Not all bins will be in use at same time (e.g. leaf and yard waste bins could be utilized for other uses during summer).

The following are the findings of the prior evaluations along with references to the Appendices to this report where the prior summary memorandums and presentations on post-closure use of the Site have been provided:

- **Passive Recreation.** This alternative is capping of all areas of the Site not utilized for public works and the incorporation of the areas into the surrounding conservation land uses. This alternative will have limited additional costs and is easily implemented.
- **Recreational Fields.** CDM Smith has evaluated a series of alternatives for athletic field alternatives on Area B of the Site. Various iterations of these alternatives along with preliminary estimates of costs are presented on all of the documents included in the all of the appendices to this report.

  The previously presented alternatives for recreational fields have been updated and revised to accommodate the current materials storage requirements as well as provide access to Area C for potential private development. The two alternatives remaining are for a single rectangular field suitable for many uses and two-softball sized fields are discussed in section 2.4.

- **Solar Photovoltaic (PV) Installation.** Many capped landfills in Massachusetts have been leased to private developers for the installation and operation of solar PV systems. To date, most of these installations have been in communities served by private electric utilities because of the availability of "net-metering' to offset the higher cost of electricity generated from solar PV.

  Installation of solar PV on Area B of the Site is discussed conceptually in the CDM Smith February 23, 2012 memorandum (Appendix B) and the CDM Smith June 15, 2012 Memorandum (Appendix C). This alternative was also presented to the Board of Selectmen by CDM Smith at their June 18, 2012 meeting (PowerPoint presentation provided in Appendix D).

  Based on the assumptions discussed in the June 15, 2012 memorandum, Area B could fit an estimated 3,600 solar PV panels with a rated capacity of approximately 1 Megawatt (MW). The solar PV field would generate approximately 1.14 million kw-hr of electricity in a year. Initial net present value economic analysis performed in 2012 indicated that the value to the town could range tremendously from a net loss to a $1.5 million net revenue over 20-years based on several assumptions.

  As the financial benefits and costs for solar PV projects has changed substantially since 2012, additional information would have to be developed and evaluated to update these costs. This work would require input from Belmont Electric and potentially soliciting proposals from private developers. These efforts can be costly and CDM Smith does not recommend any further evaluation of the solar PV alternative unless it is a preferred option selected by the Town.

  If the solar PV alternative is to be considered further, an updated estimate of costs and potential revenues needs to be performed by Belmont Light Department.

Table 2-3
Summary of Previously Evaluated Post-Closure Uses for Site

Post-Closure Use	Description	Identified Implementation Considerations
Passive Recreation and Open Space	Primary use for open space and wildlife habitat. Public use limited to trails, picnic areas, etc.	▪ Use compatible with surrounding land uses ▪ Limited additional cost beyond landfill cap construction
Athletic Field(s) for Town Uses (Assumed no field lighting)	Development of active recreational field(s) including appurtenant parking	▪ Significant site grading, drainage and erosion controls required ▪ Potential for daytime noise and traffic ▪ Need to address site security including lighting
Park and Ride Lot	Paving of portion of Area B and development of regional commuter lot	▪ Pavement could be considered final cap by MassDEP
Solar Photovoltaic (PV) Installation	Install solar PV panels on top of the capped landfill. Generated electricity to be utilized by Belmont Electric.	▪ Requires long-term lease agreement with private operator for up to 20 years ▪ Potentially generates long-term revenue – amount uncertain ▪ Consider cost structure with municipal utility – limited incentives
Private Ice Rink Development	Development of private ice rink with two sheets of ice on site	▪ Required significant retaining walls and development expense ▪ Settlement of landfilled waste issue with maintenance of ice surface ▪ Private party development required on Area B designated for only municipal use
Private Commercial Development	Town issues procurement documents to sell or lease portion of Site to private developer for office space or similar use.	▪ Initially evaluated on largest landfill area (Area B). Property now limited to municipal uses by legislation. ▪ Private development allowed on town-owned parcel (Area C)

- **Private Ice Rink Development.** In 2009, the Town was approached by a private entity who wanted to evaluate the development of a recreational ice skating facility on top of the Site. The facility was to have three full sheets of ice rinks and be housed in a 131,000 ft^2 structure. The Town retained CDM Smith to conduct an overall evaluation of the Site for post-closure uses as well as specifically look at the feasibility of the proposed skating facility. The June 18, 2009 CDM Smith memorandum summarizing the findings of this evaluation including preliminary figures is provided in Appendix A.

  The conceptual analysis conducted by CDM Smith found that the ice rink could be fit onto the Site with the incorporation of perimeter retaining walls. There was also a recommendation for additional geotechnical borings and explorations to determine if subsurface settling of the landfilled materials would compromise the rinks. Based on this initial analysis, the private entity elected to not construct the proposed skating facility at the Site.

  At this time, the limitation in the legislation that the property containing Areas A and B be only used for municipal purposes precludes the development of a private skating facility. However, the Town could potentially evaluate the use of Area B for a municipal rink. This alternative is evaluated further below.

- **Private Development.** There has been some discussion and presentation in prior evaluations about the potential for private development of the Site. The legislation that will convey the property that includes Areas A and B limits their future use to municipal purposes so the only area that can be potentially used for private development is Area C. The remaining alternatives discussed below allow Area C to be available for a potential private development. The specifics of any development on Town-owned property will have to be determined based on a set of procurement documents to be issued by the Town.

2.4 Evaluation of Additional Post-Closure Uses

Based on a review of the previously evaluated post-closure uses, the Town met with CDM Smith to review additional alternatives site uses as well as modifications of previously evaluated options such as recreational fields. This work also included modifications to the design to accommodate the potential commercial development of Area C in the future. The primary change related to the commercial development was to determine if an appropriate access road could be constructed that is separate from the DPW and other municipal uses on Area B.

The additional and updated alternatives evaluated further and discussed below are summarized in Table 2-3. These uses were evaluated using only Areas A and B of the Site as Area C was assumed to be available for commercial development and all of these potential uses included areas for the storage and processing of Town-generated materials.

On all the alternatives, Area A was utilized for public works storage and is shown as an open area without bins to allow for storage of materials prior to out-of-town transfer and potentially a snow dump. As discussed in Section 1, Area A has an existing clay cap. The limit of the proposed public works storage area at this location will have to be coordinated with the additional cost of replacing the existing cap.

The primary available area for both the bin storage of materials as well as the alternative post-closure uses is Area B. Area B also abuts Concord Avenue with the current site access point located in its northeastern corner.

2.4.1 Relocation of Police Station

The current Belmont Police Station is located at the corner of Concord Avenue and Pleasant Street in Belmont Center. A feasibility study conducted by the Town in 2008[1] on the potential reconstruction and/or relocation of the existing police facility concluded the following:

- The net space needed for a new Police Station that meets current Town requirements is 27,500 ft^2 including adequate facilities for all Town Police Department needs.
- The study reviewed 9 potential sites for the Police Station and generally used a two- or three-story building depending on the constraints of the potential sites.
- A potential future need for 65 parking spaces was identified although the present need is 56.

A conceptual site plan showing the proposed Police Station facility relocated onto Area B of the Site is shown on Figure 2-1. This plan was developed based on a two-story, 30,000 ft^2 total Police Station building with the estimated 65 future parking spaces. The plan shows a shared access road for the Police Station and the potential future development. The access road will allow for two driveways to a separate parking area for the Police Station.

The Police Station and associated parking fit easily onto the available plateau on Area B without the use of extensive retaining walls. One advantage of the use of Area B for this option is that it provides for an effective use of the southern portion of Area B for the storage bins required for Town DPW operations. The design as shown accommodates a turning area for trucks to access the bins for unloading and removal of material. Further geotechnical investigations need to be conducted to determine the specific foundation needs for the Police Station building at the Site.

2.4.2 Relocation of Public Works Facilities

The second alternative is for the relocation of the existing public works facilities currently located at an approximately 6.6 acre site at 37 C Street and 35 Woodland Street. The basis for the proposed facilities were as outlined in the March 2006 feasibility study[2] performed for the Town and include buildings for administration areas, maintenance and repair shops, storage for small and large vehicles, vehicle washing facilities, fleet maintenance and small equipment repair areas at the sizes identified in the study. These facilities will require between 75,000 and 80,000 ft^2 of new building space. The feasibility study also identified the need for parking for at least 53 employees who will work out of the new facility. The feasibility study determined that the required DPW facilities could be located at the existing site.

[1] "*Police Station Feasibility Study, Belmont, Massachusetts*," Prepared by Donham & Sweeney Architects, 2008.
[2] "*Final Report, Department of Public Works Feasibility Study for a New Public Works Facility*," Prepared by Gannett Fleming Engineers dated March 2006.

LEGEND

- EXISTING 2 FT. CONTOURS
- EXISTING 10 FT. CONTOURS
- SPOT ELEVATION
- ESTIMATED SPOT ELEVATION
- TREE/BUSH
- FENCE
- GUARD RAIL
- RETAINING WALL
- STONE WALL
- WET AREA
- BOULDER
- UTILITY POLE
- TREE LINE
- WETLAND FLAG
- APPROXIMATE EDGE OF WASTE
- APPROXIMATE PROPERTY LINE
- STORMWATER — POTENTIAL AREA FOR STORMWATER CONTROLS
- APPROXIMATE TOWN LINE
- 25–FT NO ALTER ZONE
- 100–FT WETLAND BUFFER

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CONCORD AVENUE

BELMONT, MASSACHUSETTS

CONCEPTUAL RE-USE PLAN
PUBLIC WORKS AND POLICE STATION

PROJECT NO. 19316–66833
FILE NAME: EXST001

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2-1

NOT FOR CONSTRUCTION

A plan of the relocated DPW facilities to the Site is provided in Figure 2-2. As shown on the conceptual plan, the DPW facility only fits on Area B if a significant retaining wall of 6- to 8-feet in height is constructed around virtually the entire facility plateau. Not including the potential additional costs for enhanced foundations because it is on top of the older landfill, the retaining wall represents a significant additional expense to utilizing the Site for a new DPW facility. In addition, there is not adequate room for several of the required DPW facilities including the sand and salt shed; outside storage of pipes, hydrants and other materials; and the fueling station. These items are required by the DPW and would have to be accommodated at another location.

Although the storage bins proposed for the Site are compatible with the proposed new facility, the space required to accommodate the buildings will limit access to the bins. Finally, because of the space requirements for the public works operations, the potential commercial development of Area C would have to share an access road with the bin storage areas.

Because of the space constraints of the Site and the excessive expense required to develop the flat plateau necessary for the buildings, CDM Smith does not believe that the development of the new public works facility is viable at the Site. If the Town wants to pursue this alternative further, significant effort has to be conducted in a geotechnical study to evaluate the specific foundation requirements for the buildings and retaining walls as well as more detailed site plan development to incorporate as many required DPW uses in a manner that is operationally workable.

2.4.3 Recreational Fields

CDM Smith reviewed prior plans of a rectangular field (225 feet by 360 feet with 10-foot perimeter safe zones) and two- softball fields (200-foot foul line), with associated parking and access, on a plateau on Area B. The following is a description of each of these alternative recreational uses as updated to accommodate the potential development of Area C.

The rectangular field and associated parking for 68 vehicles is shown conceptually on Figure 2-3. A second alternative with an overlay for a single softball field with a 200-foot foul line and parking for 70 vehicles immediately adjacent to the field(s) is shown on Figure 2-4. For both options, the access road to Area C passes through the parking area(s) and further refined design should evaluate layouts that separate the parking from the Area C access road, assuming that its development will move forward.

A limited retaining wall is required to maintain the required field plateau. The material storage bins are well located but additional storage would have to be developed along the western side of Area B and Area A to accommodate the Town's needs. In general, the rectangular field can be accommodated on the Site but there will likely be compromises to fit the necessary material storage areas and the roadway to Area C.

A conceptual plan showing two standalone softball fields is presented as Figure 2-5. The two softball field are designed in preferred sun angle configurations and have been separated to be independently used. Because of the area required for the fields, the parking needs to be at the bottom of the hill removed from the fields and the access road to Area C will pass both through the parking areas as well as the bin material storage areas. The number of bins is also decreased below the amount required for town operations. The two softball field option could only be accommodated with compromises to the Area C access road as well as provision of alternative locations for material storage.

LEGEND

- EXISTING 2 FT. CONTOURS
- EXISTING 10 FT. CONTOURS
- SPOT ELEVATION
- ESTIMATED SPOT ELEVATION
- TREE/BUSH
- FENCE
- GUARD RAIL
- RETAINING WALL
- STONE WALL
- WET AREA
- BOULDER
- UTILITY POLE
- TREE LINE
- WETLAND FLAG
- APPROXIMATE EDGE OF WASTE
- APPROXIMATE PROPERTY LINE
- STORMWATER — POTENTIAL AREA FOR STORMWATER CONTROLS
- APPROXIMATE TOWN LINE
- 25–FT NO ALTER ZONE
- 100–FT WETLAND BUFFER

CONCORD AVE.
ROBINWOOD ROAD
CONCORD AVENUE
(PUBLIC 55' WIDE)
MARSH STREET
STORMWATER
SWALE
50' x 90' BIN
50' x 90' BIN
50' x 60' BIN
AREA B
APPROX. 10 ACRES
PROPOSED DPW BUILDING
PAVED ROAD
STORMWATER
CULVERT
50' x 60' BIN
50' x 60' BIN
50' x 60' BIN
50' x 60' BIN
PUBLIC WORKS STORAGE AREAS
1 ACRE OF DEVELOPABLE LAND
PUBLIC WORKS
OPEN SPACE STORAGE AREA
1.5 ACRES OF DEVELOPABLE LAND
APPROX LOCATION 20' WIDE SEWER EASEMENT
BELMONT
WALTHAM
BELMONT
WALTHAM
PROPERTY
1" = 50'
25 0 50

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY:
DRAWN BY:
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY:
DATE: JUNE 2014

CDM Smith
50 Hampshire Street
Cambridge, MA 02139
Tel: (617) 452-6000

CONCORD AVENUE

BELMONT, MASSACHUSETTS

CONCEPTUAL RE-USE PLAN
PUBLIC WORKS BUILDINGS

PROJECT NO. 19316–66833
FILE NAME: EXST001

SHEET NO.
2-2

NOT FOR CONSTRUCTION

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY:
DRAWN BY:
SHEET CHK'D BY:
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APPROVED BY:
DATE: JUNE 2014

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CONCORD AVENUE

BELMONT, MASSACHUSETTS

CONCEPTUAL RE-USE PLAN
PUBLIC WORKS AND RECREATION I

PROJECT NO. 19316-66833
FILE NAME: EXST001

SHEET NO.
2-3

NOT FOR CONSTRUCTION

SOFTBALL SUN ANGLE ORIENTATION

LEGEND

- EXISTING 2 FT. CONTOURS
- EXISTING 10 FT. CONTOURS
- SPOT ELEVATION
- ESTIMATED SPOT ELEVATION
- TREE/BUSH
- FENCE
- GUARD RAIL
- RETAINING WALL
- STONE WALL
- WET AREA
- BOULDER
- UTILITY POLE
- TREE LINE
- WETLAND FLAG
- APPROXIMATE EDGE OF WASTE
- APPROXIMATE PROPERTY LINE
- STORMWATER — POTENTIAL AREA FOR STORMWATER CONTROLS
- APPROXIMATE TOWN LINE
- 25-FT NO ALTER ZONE
- 100-FT WETLAND BUFFER

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY:
DRAWN BY:
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY:
DATE: JUNE 2014

CDM Smith
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Cambridge, MA 02139
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CONCORD AVENUE

BELMONT, MASSACHUSETTS

CONCEPTUAL RE-USE PLAN
PUBLIC WORKS AND RECREATION II

PROJECT NO. 19316-66833
FILE NAME: EXST001

SHEET NO.
2-4

NOT FOR CONSTRUCTION

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY:
DRAWN BY:
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY:
DATE: JUNE 2014

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50 Hampshire Street
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Tel: (617) 452-6000

CONCORD AVENUE

BELMONT, MASSACHUSETTS

CONCEPTUAL RE-USE PLAN
PUBLIC WORKS AND RECREATION III

PROJECT NO. 19316-66833
FILE NAME: EXST001

SHEET NO.
2-5

NOT FOR CONSTRUCTION

2.4.4 Single Sheet Ice Rink

As discussed above, CDM Smith previously evaluated the construction of an ice rink to be constructed by a private entity at the Site. This evaluation identified the site foundation issues as a significant constraint. The recent legislation that will pass the property that Area B is located on to the Town limits its future use to municipal purposes so a commercial skating rink is no longer feasible at the Site. However, the Town has asked CDM Smith to evaluate a single sheet ice rink similar to the facility currently located at Belmont High School. A conceptual layout of the ice rink is provided in Figure 2-6.

While the potential foundation issues remain, the ice rink fits onto the Site and provides adequate space for the material storage bins as well as a separated access to the Area C potential development area. Further geotechnical assessment would need to be completed on Area C before this alternative could be deemed viable.

2.4.5 Updated Solar Photovoltaic Alternative

Figure 2-7 shows an updated plan of the potential for installation of solar PV system on top of the capped Area B. Based on preliminary discussions with Belmont Electric conducted prior to the November 2014 public hearing, the use of Area B for installation of a solar PV system would generate an estimated $20,000 per year in lease revenues to the Town.

If the solar PV alternative is to be considered further, an updated estimate of costs and potential revenues needs to be performed by Belmont Light Department.

2.5 Summary of Evaluation of Post-Closure Use Alternatives

Based on the evaluations conducted previously, CDM Smith has prepared Table 2-4 to summarize the potential post-closure uses, their considerations for development and viability.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY:
DRAWN BY:
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY:
DATE: JUNE 2014

CDM Smith
50 Hampshire Street
Cambridge, MA 02139
Tel: (617) 452-6000

CONCORD AVENUE

BELMONT, MASSACHUSETTS

CONCEPTUAL RE-USE PLAN
PUBLIC WORKS AND SINGLE SHEET ICE RINK

PROJECT NO. 19316-66833
FILE NAME: EXST001

SHEET NO.
2-6

NOT FOR CONSTRUCTION

PHOTOVOLTAIC PLAN

PLAN

1" = 50'

25 0 50

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY:
DRAWN BY:
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY:
DATE: JANUARY 2012

CDM Smith
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Cambridge, MA 02139
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CONCORD AVENUE

BELMONT, MASSACHUSETTS

BELMONT
CONCEPTUAL PHOTOVOLTAIC PLAN

PROJECT NO. 19316-66833
FILE NAME: E001SITE

SHEET NO.
2-7

NOT FOR CONSTRUCTION

Table 2-4
Summary of Evaluated Post-Closure Uses

Post-Closure Use	Can be Fit on Site	Separate Access Road to Area C	Significant Cost Issues	Accommodates Material Storage	Viable Alternative
Passive Recreation and Open Space	Yes	Yes	None	Yes	Yes
Rectangular Athletic Field	Yes	Yes through parking lots	Grading plateau for field	Yes	Yes
Two-Softball Fields	Yes		Grading plateau for field Small retaining wall	Partially	Maybe
Solar Photovoltaic (PV)	Yes	Yes	Purchase of PV panels Lack of incentives for municipal light company	Yes	Maybe based on financial analysis
Relocation of Police Station	Yes	Yes	Foundations	Yes	Yes
Relocated Public Works Facility	Yes with retaining walls	No	Foundations and retaining walls	No	No

Appendix A
CDM Smith June 2009 Memorandum

Memorandum

To: *Town of Belmont*

From: *Vincent Recchia, P.E.*

Date: *June 18, 2009*

Subject: *Concord Avenue Development Analysis*

1.1 Introduction

Based upon its size and location, the Concord Avenue landfill site is an excellent candidate for municipal and possibly other development. Camp Dresser & McKee Inc. (CDM) was retained to assist the Town of Belmont, Massachusetts (Town) with data collection, site analysis and evaluation of development opportunities for the Concord Avenue landfill site. The attached documents our findings on site opportunities, issues which will need to be addressed and anticipated next steps to explore the reuse proposal.

1.2 Site Description

The Belmont Landfill site encompasses approximately 25 acres. The Town obtained the original 15.63 acres of the site from the Commonwealth of Massachusetts around 1955 to construct an incinerator. The Town obtained another 9.4 acres in 1966 from the Massachusetts General Hospital. The incinerator was operated from 1959 until January 6, 1975. The site is currently used to store Department of Public Works materials. The site is currently utilized for placement of excavation for town construction projects and also for yard waste composting. The town will be required to cap the site in accordance with Mass DEP requirements in the near future to comply with the current consent order. To maximize the future use potential of the site and also reduce costs of future reuse activities, capping and reuse should be planned concurrently.

1.3 Proposed Landfill Cap

The limit of waste in Area A is approximately 4 acres in size. Recent investigations conducted by CDM determined that low permeability soil covers the waste throughout the 4 acres. It is likely that the Massachusetts Department of Environmental Protection (MassDEP) could allow the current cover material to be used as the low permeability layer of the cap over the existing waste. If the low permeability layer is accepted by MassDEP, additional material (sand and loam/gravel) above the low permeability soil will need to be placed as a drainage layer and vegetative cover layer. This area could be available for post-closure use upon completion of the cap.

Area B was the main disposal area for ash/waste and currently occupies the old incinerator building. Area B will require a landfill cap consisting of a high density polyethylene layer and soil support layers. The incinerator building will need to be demolished and placed below the cap or removed from the site. Most of Area B will be available for post closure use, but significant grading will be required of soil fills above waste to create flatter plateau to maximize use potential. A small portion of Area B will likely be needed for a storm water basin associated with capping and reuse activities. Paved parking areas and solid building foundations might have the potential to be used as the impermeable layer of the landfill cap requiring MassDEP approval. Additional features required for reuse of site above a normal landfill cap could include a more sophisticated gas venting system and indoor air quality monitor devices, if buildings are constructed. The need for a gas venting system and indoor monitoring devices will be determined by a risk assessment.

Area C is approximately 3 acres in size and is currently used by the Town for composting operations. Landfilling operations did not occur in this area. This area should not need to be capped and Town operations can continue uninterrupted.

1.4 Permitting

The landfill is surrounded by wetlands and is presumably located in an area that was originally a wetland. As a result, landfill closure will unavoidably impact wetlands. It is recommended that permitting be conducted in two phases – the first phase would address only landfill closure and any filling required would need to be accomplished in association with Phase 1 capping which would have overriding public benefit, since MassDEP will not likely grant a waiver for any filling associated with site reuse activities. The second phase would address final site reuse.

Phase 1: Landfill Closure. If geotechnical borings are within a wetland resource area, Conservation Commission approval will be required, likely through issuance of an Order of Resource Area Delineation or a Determination of Applicability, which are simplified review processes compared to that required for issuance of an Order of Conditions. If borings are only in a buffer zone, and access/egress to conduct borings does not impact wetlands, the boring program would qualify as a "minor activity" pursuant to 310 CMR 10.02(2)(b)(1)(g) and would not require Conservation Commission approval.

An estimate of impact from capping has not been made, but is anticipated that capping activities will impact to be greater than 5,000 square feet of bordering vegetated wetland. Closure can be permitted by the Belmont Conservation Commission as a "limited project" for landfill closure under the Wetlands Protection Act [310 CMR 10.53(3)(p)], assuming the limited project conditions can be met. However, if more than 5,000 square feet of wetland impact will result, capping will also require a 401 Water Quality Certificate from MassDEP and a Section 404 Permit from the Army Corps of Engineers. If there will be less than one

acre of impact, the project may qualify as a Section 404 Programmatic General Permit Category II activity, which is less involved and less time-intensive than a Section 404 Individual Permit. In addition, impact in excess of 5,000 square feet of bordering vegetated wetland would trigger the need to file an Environmental Notification Form (ENF) to meet MEPA requirements [per 301 CMR 11.03(3)(b)].

Mitigation for any wetland impacts will be required through restoration of wetlands that are temporarily disturbed during capping and replication of wetlands that are permanently altered during landfill closure.

Phase 2: Final Site Reuse. The permitting requirements for Phase 2 are unclear at this time since the extent and type of activity has not been finalized. However, it is very likely that, at a minimum, approval will be required from the Conservation Commission for work in the 100-foot buffer zone. Because final site use will not qualify as a limited project under the Wetlands Protection Act, the Conservation Commission can only approve activities that impact less than 5,000 square feet of bordering vegetated wetland. Impact in excess of this threshold would require a Variance from the Wetlands Protection Act, as well as a 401 Water Quality Certificate Army Corps Section 404 Permit, and MEPA approval (a Variance requirement would trigger the need to file an Environmental Impact Report, in addition to an ENF). It may be preferable to combine both phases in a MEPA filing, rather than addressing each in a separate filing, particularly since MEPA discourages segmentation.

As with capping, mitigation for temporary and permanent wetland impacts would be required and areas will need to be identified for this purpose.

1.5 Existing Conditions Analysis

Utilizing existing project site information and the latest March 2009 topographic survey plan (see WSP-SELLS Figure 1), CDM compiled an Existing Conditions Analysis Plan (see CDM Figure 1) to review the site opportunities and constraints of the site for potential re-use. Referring to the local Belmont Zoning By-Law (as amended though December 1, 2008) the project locus sits in the Single Residence D (SD) zoning district. Per the Use Regulations, places of assembly, amusement or athletic exercise and all business uses, as well as other listed uses are not allowed in this zoning district. The recreational skating facility investigated in this site reuse analysis would apparently require a zoning variance or other special permit.

The wetland limits shown on the analysis plan are those as flagged by CDM's Wetlands Scientists in November of 2004 and as submitted in the Request for Determination of Applicability (RDA0 in August of 2008. Related to these wetlands are a 25-ft and 100-ft wetland buffer; the 25-ft zone considered a no-touch zone.

To the east, south and west of Area A, there is a brook channel. This is currently shown conceptually but will require further delineation at the top of the bank as well as additional wetland limits beyond current flagging.

Soil test pit data information conducted by CDM in 2002 is summarized on CDM Figure 1 through Figure 3. These logs indicate depths of fill from topographic survey, and show approximate depths to waste. The site survey was updated in 2004 and again in 2009. The two survey updates show that a significant amount of cover material has been added over the waste which can be used for site grading. Record information regarding utility connections to the site is also shown.

Based on the site property boundaries, the existing wetlands and wetland no-touch zones, anticipate site regrading of fill material above waste, slope transitions to existing wetlands, and needed cap fill grades, a resulting anticipated developable area of approximately six acres for Area B was identified, as depicted in CDM Figure 1).

1.6 Conceptual Re-Use Plan for a Skating Rink Complex

CDM investigated a conceptual layout of a proposed 131,125-s.f (first floor only) recreational skating facility, with three rinks, using the footprint previously provided by the rink developer to the Town and CDM. Given the constraints of the site, overall size of the facility and required parking, the final arrangement of the facility on the site is limited to the layout in CDM Figure 2. This conceptual layout demonstrates the possibilities for developing such a facility on this site from a spatial perspective.

The building is rotated northwest towards Concord Avenue with the approach road to the site placed at about 180-ft from the northwest corner of the site. A drop off area occurs at the front of the building, with adjacent parking (including handicap parking) for approximately 85 vehicles. The main access drive continues to the west of the facility around to the rear (south) side. A service area is located here, as well as additional parking for approximately 135 vehicles, bringing the onsite vehicle total to approximately 220 vehicles within the Area B development area. A fire lane continues around the east side of the facility, connecting the front and rear parking lots. To the south of this parking area, the main access drive can be connected to the current DPW composting area. The depicted layout assumes the construction of site retaining walls along the edges of the fire lane and southerly parking area. During further design refinement, these walls can potentially be reduced in height or eliminated with the used of graded slopes.

CDM Figure 3 depicts an alternate parking area on Area A, to the west of the facility. This lot could be accessed of the main access drive, just off the main entrance. As shown, there is potential for approximately 160 vehicles in this parking area. Combined with the other site parking, this expands the total potential parking to about 380 vehicles.

If the Town were to consider other site reuse activities, in-lieu of the skating rink complex, the same plateau might be provided for the purposes of constructing sports fields or other desired reuse activities. To reduce the construction of costly walls the site developable area could be reduced.

1.7 Conceptual Re-Use Plan for Recreational Fields

CDM also investigated a conceptual layout for outdoor recreational fields. The site can possibly accommodate two athletic fields with adjacent parking and a small parking area of 160 spaces in Area A provided the same retaining wells identified in Section 1.6 are utilized. The 160 parking area could possibly be replaced with a small practice field. The significant cost to install the retaining walls would likely be too high to justify the creation of two athletic fields. A more sophisticated grading plan and evaluation is necessary to determine if an athletic facility would fit without retaining walls. The conceptual field layouts are shown on CDM Figure 4 and 5.

Both the athletic fields and skating rink facility will limit the usable space for the Department of Public works to Area C which is approximately 2.5 acres in size. Currently the Department of Public Works utilizes approximately 6.5 acres of the site for various operations.

1.8 Subsequent Activities

The next steps for the closure and post-closure use evaluation of the site are as follows:

- **Comprehensive Site Assessment Approval.** CDM is currently awaiting approval from MassDEP of the previously submitted CSA.

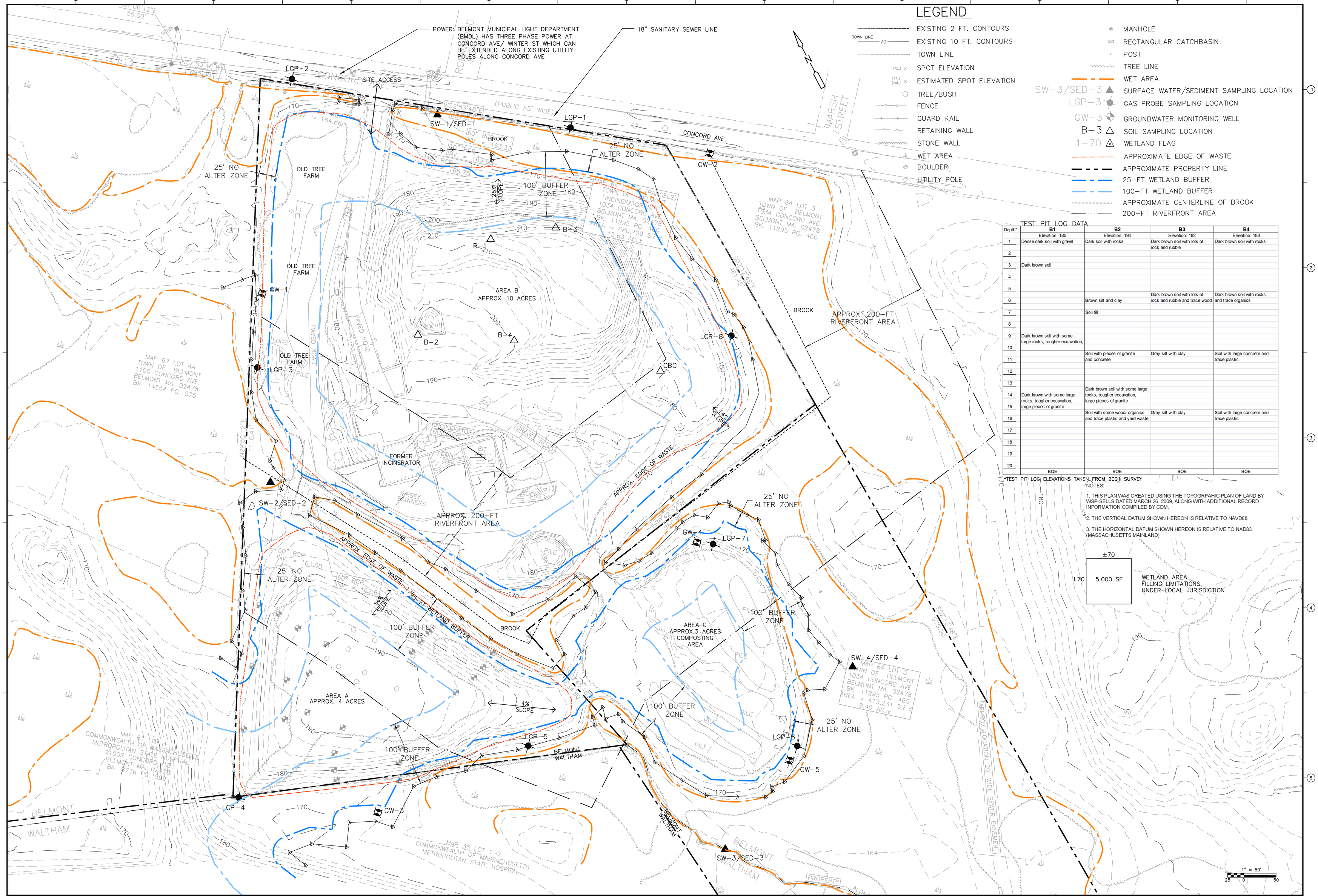
- **Geotechnical Borings.** Geotechnical borings will be required to evaluate soil conditions for design of support piles for the skating rink complex. The borings will determine depth of fill above waste, the soil type, depth of waste material, density, and depth to firm soils suitable for building support (since there could be some unsuitable soils associated with the filled wetlands. Even if alternative reuses are considered some borings will be required to determine at a minimum the depth of fills above waste so that a grading plan can be developed to reshape site to maximize use potential.

- **Corrective Action Alternatives Analysis Submittal.** The CAAA report is a required submittal to MassDEP which analyzes the differently capping options for the site. The CAAA report will be finalized to reflect the type of post closure use the Town wishes to explore at the site.

- **Corrective Action Design.** The CAD report, plans and specifications will describe the landfill capping procedure and components. It will also describe the necessary post-closure monitoring and inspection requirements.

- **Post-Closure Use Permit.** The post closure use permit will be submitted simultaneously with the CAD report and describe in detail the construction of the proposed post closure use.

- **Permits.** Finalize the plan and schedule for permitting activities, especially for early start activities such as borings and for time—intensive permitting processes such as MEPA approval and if required, obtaining a Variance from the Wetlands Protection Act.



LEGEND

- EXISTING 2 FT. CONTOURS
- EXISTING 10 FT. CONTOURS
- TOWN LINE
- SPOT ELEVATION
- ESTIMATED SPOT ELEVATION
- TREE/BUSH
- FENCE
- GUARD RAIL
- RETAINING WALL
- STONE WALL
- WET AREA
- BOULDER
- UTILITY POLE
- MANHOLE
- RECTANGULAR CATCHBASIN
- POST
- TREE LINE
- WET AREA
- SW-3/SED-3 SURFACE WATER/SEDIMENT SAMPLING LOCATION
- LGP-3 GAS PROBE SAMPLING LOCATION
- GW-3 GROUNDWATER MONITORING WELL
- B-3 SOIL SAMPLING LOCATION
- 1-70 WETLAND FLAG
- APPROXIMATE EDGE OF WASTE
- APPROXIMATE PROPERTY LINE
- 25-FT WETLAND BUFFER
- 100-FT WETLAND BUFFER
- APPROXIMATE CENTERLINE OF BROOK
- 200-FT RIVERFRONT AREA

TEST PIT LOG DATA

Depth*	B1	B2	B3	B4
	Elevation: 185	Elevation: 194	Elevation: 182	Elevation: 183
1	Dense dark soil with gravel	Dark soil with rocks	Dark brown soil with lots of rock and rubble	Dark brown soil with rocks
2				
3	Dark brown soil			
4				
5				
6		Brown silt and clay	Dark brown soil with lots of rock and rubble and trace wood	Dark brown soil with rocks and trace organics
7		Soil fill		
8				
9	Dark brown soil with some large rocks, tougher excavation,			
10				
11		Soil with pieces of granite and concrete	Gray silt with clay	Soil with large concrete and trace plastic
12				
13				
14	Dark brown with some large rocks, tougher excavation, large pieces of granite	Dark brown soil with some large rocks, tougher excavation, large pieces of granite		
15				
16		Soil with some wood/ organics and trace plastic and yard waste	Gray silt with clay	Soil with large concrete and trace plastic
17				
18				
19				
20				
	BOE	BOE	BOE	BOE

*TEST PIT LOG ELEVATIONS TAKEN FROM 2001 SURVEY

NOTES:

1. THIS PLAN WAS CREATED USING THE TOPOGRPAHIC PLAN OF LAND BY WSP-SELLS DATED MARCH 26, 2009. ALONG WITH ADDITIONAL RECORD INFORMATION COMPILED BY CDM.
2. THE VERTICAL DATUM SHOWN HEREON IS RELATIVE TO NAVD88.
3. THE HORIZONTAL DATUM SHOWN HEREON IS RELATIVE TO NAD83. (MASSACHUSETTS MAINLAND)

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY:
DRAWN BY:
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY:
DATE: APRIL 2009

CDM Camp Dresser & McKee Inc.
consulting engineering construction operations
50 HAMPSHIRE STREET
CAMBRIDGE, MA 02139
(617) 452-6000

CONCORD AVENUE LANDFILL
BELMONT, MASSACHUSETTS

EXISTING CONDITIONS ANALYSIS

PROJECT NO. 41959
FILE NAME: EXST001

SHEET NO. 1

POWER: BELMONT MUNICIPAL LIGHT DEPARTMENT (BMDL) HAS THREE PHASE POWER AT CONCORD AVE/ WINTER ST WHICH CAN BE EXTENDED ALONG EXISTING UTILITY POLES ALONG CONCORD AVE

18" SANITARY SEWER LINE

LEGEND

- EXISTING 2 FT. CONTOURS
- EXISTING 10 FT. CONTOURS
- TOWN LINE
- SPOT ELEVATION
- ESTIMATED SPOT ELEVATION
- TREE/BUSH
- FENCE
- GUARD RAIL
- RETAINING WALL
- STONE WALL
- WET AREA
- BOULDER
- UTILITY POLE
- MANHOLE
- RECTANGULAR CATCHBASIN
- POST
- TREE LINE
- WET AREA
- SURFACE WATER/SEDIMENT SAMPLING LOCATION (SW-3/SED-3)
- GAS PROBE SAMPLING LOCATION (LGP-3)
- GROUNDWATER MONITORING WELL (GW-3)
- SOIL SAMPLING LOCATION (B-3)
- WETLAND FLAG (1-70)
- APPROXIMATE EDGE OF WASTE
- APPROXIMATE PROPERTY LINE
- 25-FT WETLAND BUFFER
- 100-FT WETLAND BUFFER
- APPROXIMATE CENTERLINE OF BROOK
- 200-FT RIVERFRONT AREA

TEST PIT LOG DATA

Depth*	B1	B2	B3	B4
	Elevation: 185	Elevation: 194	Elevation: 182	Elevation: 183
1	Dense dark soil with gravel	Dark soil with rocks	Dark brown soil with lots of rock and rubble	Dark brown soil with rocks
2				
3	Dark brown soil			
4				
5				
6		Brown silt and clay	Dark brown soil with lots of rock and rubble and trace wood	Dark brown soil with rocks and trace organics
7		Soil fill		
8				
9	Dark brown soil with some large rocks, tougher excavation,			
10				
11		Soil with pieces of granite and concrete	Gray silt with clay	Soil with large concrete and trace plastic
12				
13				
14	Dark brown with some large rocks, tougher excavation, large pieces of granite	Dark brown soil with some large rocks, tougher excavation, large pieces of granite		
15				
16		Soil with some wood/ organics and trace plastic and yard waste	Gray silt with clay	Soil with large concrete and trace plastic
17				
18				
19				
20				
	BOE	BOE	BOE	BOE

*TEST PIT LOG ELEVATIONS TAKEN FROM 2001 SURVEY

NOTES:

1. THIS PLAN WAS CREATED USING THE TOPOGRPAHIC PLAN OF LAND BY WSP-SELLS DATED MARCH 26, 2009, ALONG WITH ADDITIONAL RECORD INFORMATION COMPILED BY CDM.
2. THE VERTICAL DATUM SHOWN HEREON IS RELATIVE TO NAVD88.
3. THE HORIZONTAL DATUM SHOWN HEREON IS RELATIVE TO NAD83. (MASSACHUSETTS MAINLAND)

±70 / ±70 / 5,000 SF — WETLAND AREA FILLING LIMITATIONS UNDER LOCAL JURISDICTION

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY:
DRAWN BY:
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY:
DATE: APRIL 2009

CDM Camp Dresser & McKee Inc.
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CONCORD AVENUE LANDFILL
BELMONT, MASSACHUSETTS

CONCEPTUAL RE-USE PLAN
WITH ALT. PARKING

PROJECT NO. 41959
FILE NAME: EXST001

SHEET NO.
3

POWER: BELMONT MUNICIPAL LIGHT DEPARTMENT (BMDL) HAS THREE PHASE POWER AT CONCORD AVE/ WINTER ST WHICH CAN BE EXTENDED ALONG EXISTING UTILITY POLES ALONG CONCORD AVE

18" SANITARY SEWER LINE

CONCORD AVENUE

CONCORD AVE.

SITE ACCESS

MARSH STREET

25' NO ALTER ZONE

OLD TREE FARM

AREA B
APPROX. 10 ACRES

PROPOSED BUILDING

FORMER INCINERATOR

APPROX. 200-FT RIVERFRONT AREA

APPROX. EDGE OF WASTE

APPROX. 25-FT WETLAND BUFFER

APPROX. PROPERTY LINE

100' BUFFER ZONE

AREA A
APPROX. 4 ACRES

4% SLOPE

BROOK

DPW ACCESS TO COMPOSTING AREA

COMPOSTING AREA

APPROX. LOCATION 20' WIDE SEWER EASEMENT

PROPERTY LINE

BELMONT
WALTHAM

MAP 67 LOT 4A
TOWN OF BELMONT
1100 CONCORD AVE.
BELMONT MA. 02478
BK. 14554 PG. 575

MAP 64 LOT 3
TOWN OF BELMONT
1034 CONCORD AVE.
BELMONT MA. 02478
BK. 11295 PG. 460

MAP 67 LOT 4
COMMONWEALTH OF MASSACHUSETTS
METROPOLITAN STATE HOSPITAL
1100R CONCORD AVE.
BELMONT MA. 02478
BK. 9736 PG. 133

MAP 36 LOT 1-2
COMMONWEALTH OF MASSACHUSETTS
METROPOLITAN STATE HOSPITAL

SW-1/SED-1
SW-2/SED-2
SW-3/SED-3
SW-4/SED-4

LGP-2
LGP-3
LGP-4
LGP-5
LGP-6
LGP-7

GW-2
GW-3
GW-4
GW-5

B-1
B-2
B-3

LEGEND

- EXISTING 2 FT. CONTOURS
- EXISTING 10 FT. CONTOURS
- TOWN LINE
- SPOT ELEVATION
- ESTIMATED SPOT ELEVATION
- TREE/BUSH
- FENCE
- GUARD RAIL
- RETAINING WALL
- STONE WALL
- WET AREA
- BOULDER
- UTILITY POLE
- MANHOLE
- RECTANGULAR CATCHBASIN
- POST
- TREE LINE
- WET AREA
- SW-3/SED-3 SURFACE WATER/SEDIMENT SAMPLING LOCATION
- LGP-3 GAS PROBE SAMPLING LOCATION
- GW-3 GROUNDWATER MONITORING WELL
- B-3 SOIL SAMPLING LOCATION
- 1-70 WETLAND FLAG
- APPROXIMATE EDGE OF WASTE
- APPROXIMATE PROPERTY LINE
- 25-FT WETLAND BUFFER
- 100-FT WETLAND BUFFER
- APPROXIMATE CENTERLINE OF BROOK
- 200-FT RIVERFRONT AREA

TEST PIT LOG DATA

Depth*	B1	B2	B3	B4
	Elevation: 185	Elevation: 194	Elevation: 182	Elevation: 183
1	Dense dark soil with gravel	Dark soil with rocks	Dark brown soil with lots of rock and rubble	Dark brown soil with rocks
2				
3	Dark brown soil			
4				
5				
6		Brown silt and clay	Dark brown soil with lots of rock and rubble and trace wood	Dark brown soil with rocks and trace organics
7		Soil fill		
8				
9	Dark brown soil with some large rocks, tougher excavation,			
10				
11		Soil with pieces of granite and concrete	Gray silt with clay	Soil with large concrete and trace plastic
12				
13				
14	Dark brown with some large rocks, tougher excavation, large pieces of granite	Dark brown soil with some large rocks, tougher excavation, large pieces of granite		
15				
16		Soil with some wood/ organics and trace plastic and yard waste	Gray silt with clay	Soil with large concrete and trace plastic
17				
18				
19				
20				
	BOE	BOE	BOE	BOE

*TEST PIT LOG ELEVATIONS TAKEN FROM 2001 SURVEY

NOTES:

1. THIS PLAN WAS CREATED USING THE TOPOGRPAHIC PLAN OF LAND BY WSP-SELLS DATED MARCH 26, 2009, ALONG WITH ADDITIONAL RECORD INFORMATION COMPILED BY CDM.
2. THE VERTICAL DATUM SHOWN HEREON IS RELATIVE TO NAVD88.
3. THE HORIZONTAL DATUM SHOWN HEREON IS RELATIVE TO NAD83. (MASSACHUSETTS MAINLAND)

±70 / ±70 5,000 SF — WETLAND AREA FILLING LIMITATIONS UNDER LOCAL JURISDICTION

1" = 50'
25 0 50

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY:
DRAWN BY:
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY:
DATE: APRIL 2009

CDM Camp Dresser & McKee Inc.
50 HAMPSHIRE STREET
CAMBRIDGE, MA 02139
(617) 452-6000

CONCORD AVENUE LANDFILL
BELMONT, MASSACHUSETTS

CONCEPTUAL RE-USE PLAN

PROJECT NO. 41959
FILE NAME: EXST001

SHEET NO. 2

Appendix B
CDM Smith February 2012 Memorandum

Memorandum

To: *Peter Castanino, Director of Public Works*
Glenn Clancy, Director of Community Development

From: *Bruce W. Haskell, P.E.*

Date: *February 23, 2012*

Subject: *Discussion of Potential Alternative Post-Closure Uses of Concord Avenue Landfill*

1.1 Background

Over the past several years, the Town of Belmont (Town) has progressed through the closure process for the Concord Avenue Landfill Site as required by Massachusetts Department of Environmental Protection (MassDEP) regulations. Many other Massachusetts communities including Cambridge, Arlington, Boston, Reading, Brookline and Newton have taken the opportunity of closing their landfill to develop community assets including recreational fields and public works operations areas. Other communities are now looking at their capped landfill sites for the installation of solar photovoltaic facilities. The Town is now at the point to begin the planning process for the preferred post-closure use of the site so that its construction can be incorporated into the final closure construction.

Based upon some preliminary work, the size and location of the Concord Avenue landfill site make it an excellent candidate for a variety of post-closure uses including municipal and possibly other development opportunities. CDM Smith Inc. (CDM Smith) has been asked by the Town to prepare this memorandum to evaluate various post-closure use options and provide preliminary information on implementation approaches and costs. The intent of this memorandum is to facilitate the selection process of the preferred post-closure uses.

The site currently provides a necessary function for the town with the ongoing public works storage and stockpiling operations including leaf and yard waste composting. These operations will have to either be incorporated into the selected post-closure use of the site or significant additional funds will have to be appropriated to modify how the town currently provides these services.

There are several general considerations for implementing a post-closure use on the Concord Avenue landfill including:

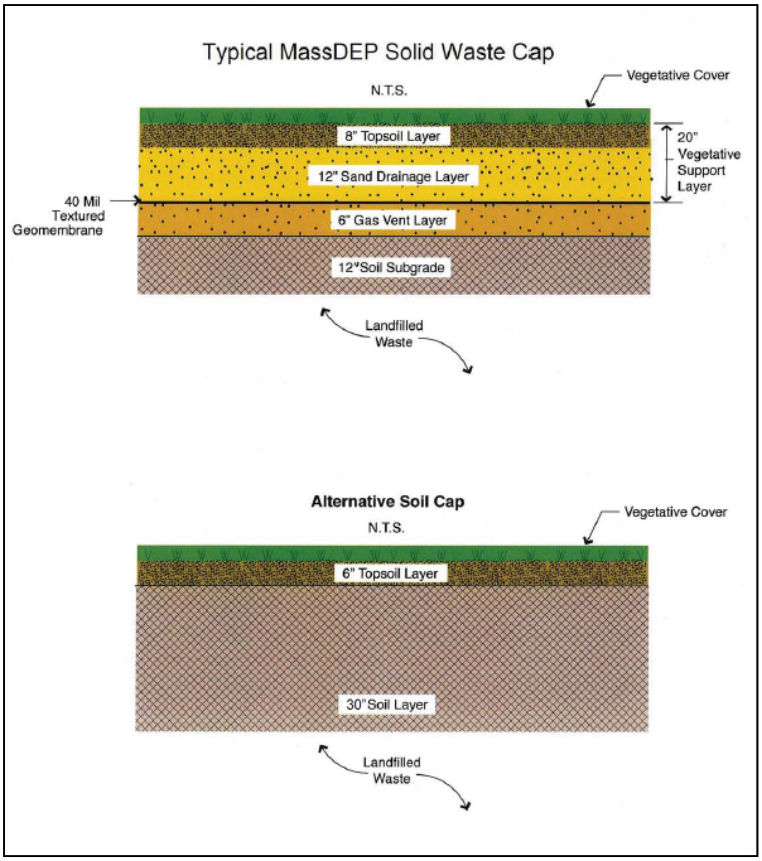
- The total area of the former landfill site is approximately 25 acres – a total of approximately 17 acres were historically either used for landfilling or are filled with non-waste materials. The

remaining 8 acres is predominantly wetland resource areas with no potential for an active post-closure use.

The Town previously capped a portion of the landfill and CDM Smith has been documenting to MassDEP that these areas are not required to be re-capped in accordance with current regulations. Post-closure uses that bring the public onto the site may require re-capping of these areas and increase the overall project costs. An existing conditions plan showing the various areas of the landfill is attached to this memorandum.

CDM Smith notes that the largest area of the site (the approximate 10-acres known as Area B located adjacent to the site entrance and Concord Avenue), though partially capped in the 1980s, will require additional soils to be approved by MassDEP as a final cap. Refer to Sheet 1 for approximate area delineations.

- Because the landfill predominantly accepted solid waste ash from the on-site incinerator and various inert materials such as wood debris and soils, MassDEP may allow an alternative cap that is less costly than their standard required landfill cap. Alternatives to the MassDEP standard cap that have been approved by MassDEP at similar sites include a three-foot thick soil cap and pavement. These alternative caps may be compatible with some of the post-closure uses and not others. Cross-sections of typical MassDEP standard and alternative soil cap are shown below. The pavement cap will be similar to the surface used for a parking lot or roadway.



To monitor the Town's liability with the closure of the site, CDM Smith prepares a letter annually that updates the anticipated costs for closure of the landfill in accordance with MassDEP regulations. The most recent letter dated October 27, 2011, estimated the total cost for closure at approximately $3.7 million including the demolition of the incinerator building but not including any cost related to post-closure uses. This estimate includes the supplemental soil layers required for portions of the landfill that were capped with clay by the Town in the 1980's.

- Intensive uses of the site by individuals (e.g. residential, schools, etc.) will require significant additional environmental testing and assessment of the existing landfilled materials before evaluating further. It is unlikely in any case that MassDEP would approve these types of uses on an old landfill site. As discussed below, these types of uses are not currently under consideration by the Town.

- The landfill is surrounded by conservation land on the south side of Concord Avenue and residential properties to the north. The selected post-closure use needs to be compatible with these surrounding land uses as well as local zoning.

- Any post-closure use beyond passive open space with limited public access will require approval by MassDEP of a post-closure use permit application. This approval will be required for the continued use of the site by the Town for public works operations. Because the site is surrounded by wetland resource areas, the active uses will also require approval of the Belmont Conservation Commission including the provisions for stormwater management.

Potential Alternative Post-Closure Use Alternatives

The list of potential post-closure use alternatives being evaluated is divided into two categories: alternatives without a building/foundation and alternatives with a building/foundation. The grouping of alternatives in this manner allows for comparisons to be made with regard for cost considerations when evaluating construction of a permanent structure.

A summary of the alternatives that the Town has requested be considered as part of this preliminary evaluation is provided in Table 1. The general considerations of each of these alternatives, as well as the baseline development of a public works operations area are summarized below.

Table 1
Summary of Potential Post-Closure Use Alternatives at
Concord Avenue Landfill

Potential Post Closure Use Alternatives[1]	
Alternatives with no subsurface foundations	Capping with a passive recreation
	Capping with an multi-use athletic field (grass or synthetic) and associated parking
	Capping with a solar panels
Alternatives with subsurface foundations	One story building
	Skating rink
	Multi-story office building

1. All alternatives will include a portion of the site continuing to be used for Town public works operations.

Development of Post-Closure Public Works Area

CDM Smith reiterates that all of the post-closure alternatives for the landfill will incorporate the continued use of the site for various public works operations including those outlined in Table 2 below.

Table 2
Summary of Future Public Works Uses at
Concord Avenue Landfill Site, Belmont

Summary of Future Public Works Uses
General material storage – pipes, excess soil from trench excavation and other public works related construction items
Contractor staging area for Town projects
Snow disposal area
Temporary storage of appliances for recycling – both those containing CFCs and others
Temporary tree and brush storage area
Asphalt and concrete temporary storage and recycling area. Storage of finished product.
Temporary sanitary sewer and storm drain system debris storage
Temporary street sweeping storage with out-of-town disposal
Temporary catch basin cleaning storage with out-of-town disposal

Note: The public works department currently performs leaf and yard waste composting on a portion of the site. In developing the proposed future post-closure uses including the public works operations areas, CDM Smith has assumed that the current composting operations will be discontinued.

Most of these operations can be located on a paved surface with appropriate covers over several of the storage areas and stormwater controls to reduce the impact of run-off from the storage on the adjacent wetland resource areas. A paved surface has been approved by the MassDEP as the final cap over similar public works operations areas in other municipalities. The perimeter of the operations area(s) would be grassed with an appropriate cap as approved by MassDEP. The operations listed in Table 2 above, except for the snow disposal area, could fit onto a combination of each portion of the landfill.

MassDEP policies preclude the disposal of snow over landfills and this continuing use will have to be incorporated into the final closure. However, MassDEP has recognized that in certain communities there are limited areas other than the old landfill to accept snow during significant storm events. At this time, CDM Smith has assumed that the former landfilled Area A could be utilized for snow disposal as well as temporary storage of brush and other storm debris. This approach will have to be approved by MassDEP.

Post-Closure Alternatives with No Subsurface Foundation Requirements

Based on the review of the available areas, it appears that most of Area B, the approximately 10-acres of the former landfill located adjacent to Concord Avenue, could be used for a post-closure use. Below is a general discussion of the types of uses that will not require significant subsurface foundations.

Passive Recreational Use of Site

This alternative is the development of a grassed surface of the site potentially with pathways to access it and the surrounding conservation areas and parking.

Because public access is limited in both frequency and time for this use, the Town can likely receive approval of the alternative three-foot thick soil cap discussed above. This cap will cost approximately $100,000 to $120,000 per acre to construct (note that the approval of an alternative cap requires MassDEP approval). The costs to construct the post-closure use elements such as pathways and parking areas are low and can range from no additional cost to an allowance of $100,000 to include a small parking area. The maintenance requirements for this type of cap include periodic mowing (twice per year) and repairs of any cap requirements. For a landfill this size, the annual maintenance cost for a passive recreation area is estimated at less than $10,000 per year.

Athletic Field

The development of athletic fields is probably the most common use for capped landfill sites. Local examples include Danehy Park in Cambridge, Millennium Park in West Roxbury, Pope John Paul II Park in Dorchester and Skyline Park in Brookline. Each of these sites included at least one large recreational field with appurtenant parking and pathways as well as other small structures including lights, bathroom facilities and playground structures.

Based on a conceptual design completed by CDM Smith, one large athletic field (size 225 feet by 360 feet with the appropriate perimeter safe zones) along with the associated parking and pathways could be constructed at the site. A plan showing the approximate location of the athletic field is attached to this memorandum. The final plan to be developed as part of the landfill closure will include the appropriate fencing and landscaping that is not shown on the attached figure.

Typically, landfills where athletic fields have been developed have been required by MassDEP to construct a final cap in accordance with MassDEP regulations (cost $175,000 per acre). This cap is required because of the intensive public use of the fields and to limit any potential exposure to the underlying landfilled waste. However, MassDEP may accept an alternative cap consisting of a three-foot soil layer for this site given its history and the results of the environmental assessment to date. The type of cap that will be proposed for the site will be based on the results of the further environmental assessment being undertaken by the Town in 2012.

CDM Smith had previously estimated that the construction of the athletic field and associated items (assuming a grassed field) will cost an estimated $1.2 to $1.8 million in addition to the cost to construct the final cap. Please note that these costs are for planning purposes only and significant work has to be completed to develop a more accurate estimate.

Solar Photovoltaic (PV) System

Recently, many communities have solicited proposals from private development firms to install solar PV panels at their landfill sites. The installation of these systems at the site are on top of the final cap and do not require any buried foundation or electrical conduit systems.

The viability of installing solar PV panels on top of a capped landfill has many considerations including the available flat area, the extent of south-facing slopes, and the proximity of utility power capable of accepting the electrical load from the PV field. To date, PV systems have been primarily installed on landfills in communities served by private electric utilities because of the availability of “net-metering” to offset the higher cost of solar electricity. However, based on CDM Smith’s discussions with a solar developer about other sites, an installation in a community with a municipally owned electric utility could be cost effective. The net revenues from the electricity generated by a solar PV installation will be based on several factors including the sale price of electricity, the proximity of a location to interconnect into the electric grid and the total area available for panel installation.

An alternative cap such as the three-foot thick soil cover discussed above at a cost of approximately $100,000 to $120,000 per acre to construct would be appropriate for the final cap for the solar PV post-closure use. Maintenance of the site would require more frequent vegetation removal than the passive recreation option but those costs would be incorporated into the business model for the solar PV system.

Potential Post-Closure Uses with Significant Subsurface Foundations

There has been some work conducted by CDM Smith regarding the development of a skating rink at the landfill site. The only significant building CDM Smith is aware of in Massachusetts over a capped landfill is the Jordan's Furniture complex partially constructed over the Reading Landfill. Other facilities including UMass-Boston, are constructed over older dumping ground sites.

A structure such as a one or two-story building will have similar project planning and design requirements including:

- Development of a detailed geotechnical boring program to determine the foundation requirements both over the landfilled waste and the underlying natural soils. It is likely that the development of any significant structure on the landfilled areas will require some type of enhanced foundation. This geotechnical information is also needed to determine if the construction of the foundation will generate any excess landfilled materials that will require disposal (either on- or off-site).

- The building(s) and associated parking areas will require the construction of significant surficial stormwater management systems.

- The proposed development needs to be coordinated with the types of the surrounding land uses, including the conservation and residential areas. In addition, it is likely that changes to the site zoning or variances would be required for these uses.

- While a skating rink could be constructed by the Town primarily for its own use, the only method to determine the value of the commercial development options is to develop a Request for Proposals (RFP) to lease the property under Massachusetts procurement regulations. The RFP will have to provide significant information such as the geotechnical report, traffic limits, zoning requirements, and wetland resource area setbacks so that potential developers could accurately provide the Town with a price to lease the property. For other clients, CDM Smith has prepared estimates of potential revenues based on generally published data, but given the uniqueness of the site and the extra development costs related to building on a landfill, these estimates will not be comparable.

- The building(s) and associated parking areas would be an appropriate final cap to comply with MassDEP regulations. The final details of the cap, including any utility corridors, would have to be determined as part of the final design of the structure and approved by MassDEP.

Summary of Comparative Construction and Operations Cost

Table Three below is excerpted from CDM Smith's letter dated October 28, 2011 outlining the range of costs associated with the capping of the Concord Avenue Landfill as well as the additional costs for the demolition of the incinerator building.

Table 3
Summary of Range of Potential Cap Construction Costs
Concord Avenue Landfill, Belmont

Cost Item	Basis	Est. Construction Cost	
		Low	High
Design, Permitting and Construction of Final Cap			
Area A	4 acres previously partially capped. Additional cap layers likely required at cost of $125k per acre	$500,000	$500,000
Area B	10 acres requiring new cap at between $125k per acre for alternative cap to $175k per acre for MassDEP standard	$1,250,000	$1,750,000
Area C	Not historically landfilled – no further work required	$0	$0
	Subtotal Cap Construction	$1,750,000	$2,250,000
	Cap Design and Permitting	$90,000	$90,000
	Corrective Actions Alternative Analysis (Allowance)	$200,000	$200,000
	Engineering During Construction (Allowance of 8%)	$140,000	$180,000
	Contingency (20% of cap construction subtotal)	$350,000	$450,000
Total Estimated Final Cap Construction		**$2,530,000**	**$3,170,000**
Building Demolition			
Abatement	Estimate (2009) from CDM Smith subconsultant	$145,000	
Demolition	Preliminary CDM Smith estimate for remaining demolition	$300,000	
	Subtotal Building Demolition	$445,000	
	Contingency (20%)	$89,000	
	Total Estimated Building Demolition Costs	**$534,000**	
	TOTAL ESTIMATED CONSTRUCTION COSTS	**$3,064,000**	**$3,704,000**

Notes

1. All costs in 2011 dollars.
2. Costs do not include any post-closure use of site by town (e.g. recreational fields or public works operations areas).
3. Designation of capping requirements for Areas A and C have been presented to MassDEP but require their final approval.
4. Costs do not include remediation of groundwater or significant areas of wetland sediments located outside limits of landfill.

To allow the Town to compare the range potential costs of closure costs with the various post-closure use alternatives, CDM Smith prepared Table 4 below. In this table, CDM Smith has included the costs for capping (alternative cap and MassDEP standard); an allowance of $350,000 for the development of the storage areas to be utilized by the public works department; the demolition of the on-site incinerator building; and various recreational uses. Table 4 provides the estimate of these cost ranges anticipated for potential post-closure use options without subsurface foundation requirements. Note that these costs are being presented for initial discussion purposes and will require significant discussions with the Town on the details for the selected post-closure use;

permitting by both the MassDEP and the Belmont Conservation Commission; and inclusion of any work associated with the remediation of the wetlands based on the outcome of the ongoing work.

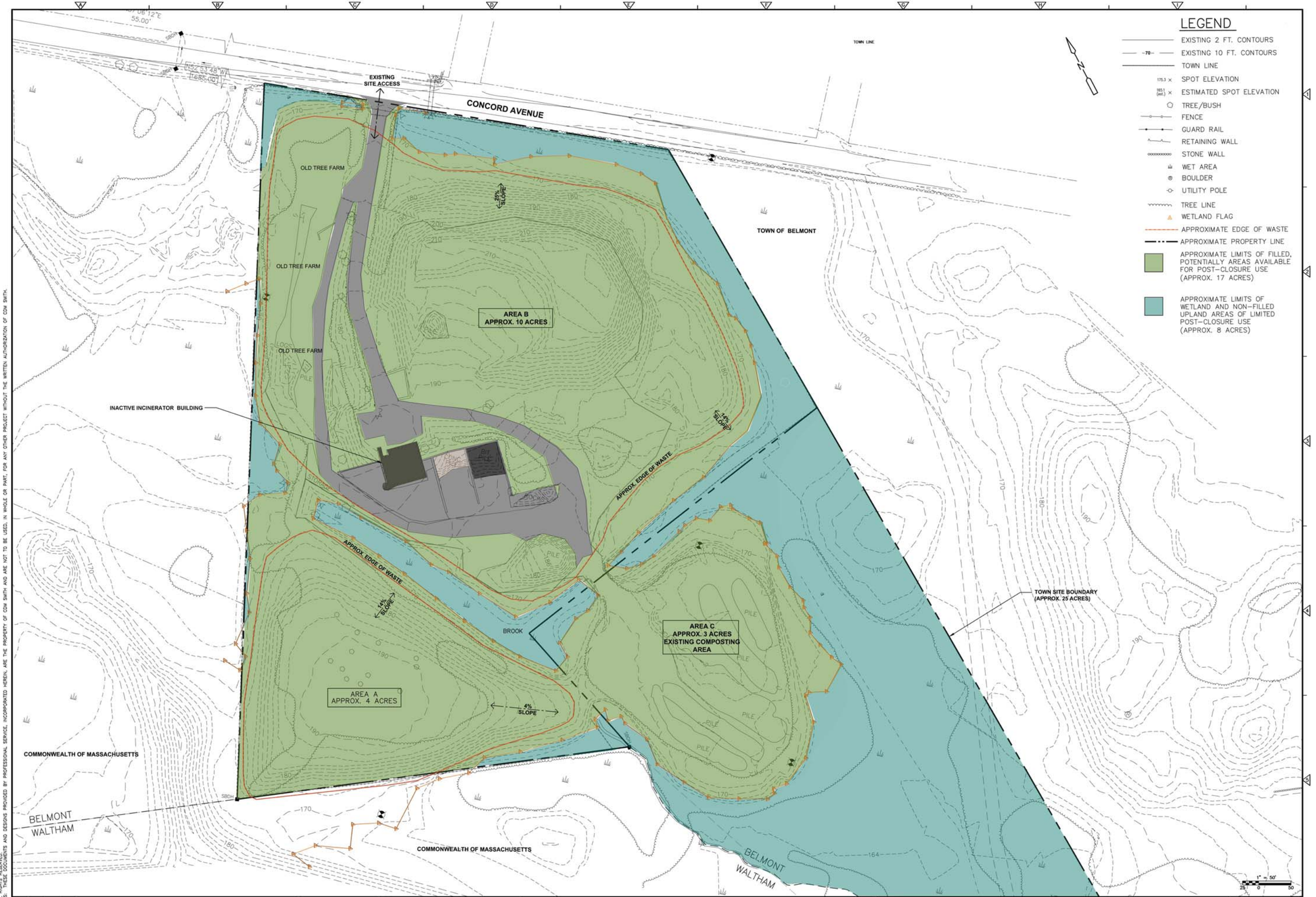
Table 4
Summary of Range of Comparative Construction Costs for Site Remediation and Development of Post-Closure Options Without Subsurface Foundations[2]
Concord Avenue Landfill Site, Belmont

Option	Cap Construction Costs		Demolition of Incinerator Building	Public Works Operations Area	Post-Closure Costs		Total Comparative Costs	
	Low	High			Low	High	Low	High
Capping with a passive recreation	$2,530,000	$3,170,000	$534,000	$350,000	$0	$100,000	$3,414,000	$4,154,000
Capping with an athletic field & parking	$2,530,000	$3,170,000	$534,000	$350,000	$1,200,000	$1,800,000	$4,614,000	$5,854,000
Capping with a solar panels	$2,530,000	$3,170,000	$534,000	$350,000	$0[1]	$0[1]	$3,414,000	$4,054,00

1. The installation of solar panels will be completed by a third-party vendor and will potentially generate revenues to the Town.
2. Costs do not include the items outlined in the notes for Table 3 above.

Due to the many variables and design unknowns, it is not possible at this time to provide a cost estimate for options including subsurface foundations. As a whole, due to the planning and design considerations described above, the cost of these options will likely exceed the cost of the options with no subsurface foundation requirements. If a post-closure use option with subsurface foundation is selected for further consideration, the Town would need to take the next steps toward establishing the planning and design criteria such as the size and type of the building.

We are available to meet with you to discuss this further and respond to any questions you may have. Please do not hesitate to contact me with any questions or comments.



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY:
DRAWN BY:
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY:
DATE: JANUARY 2012

CDM Smith
50 Hampshire Street
Cambridge, MA 02139
Tel: (617) 452-6000

CONCORD AVENUE

BELMONT, MASSACHUSETTS

EXISTING CONDITIONS PLAN

PROJECT NO. 19316-66833
FILE NAME: EXST001

SHEET NO.
1

NOT FOR CONSTRUCTION

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY:
DRAWN BY:
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY:
DATE: JANUARY 2012

CDM Smith
50 Hampshire Street
Cambridge, MA 02139
Tel: (617) 452-6000

CONCORD AVENUE

BELMONT, MASSACHUSETTS

CONCEPTUAL RE-USE PLAN
PUBLIC WORKS AND RECREATION

PROJECT NO. 19316-66833
FILE NAME: EXST001
SHEET NO. 2

NOT FOR CONSTRUCTION

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY:
DRAWN BY:
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY:
DATE: JANUARY 2012

CDM Smith
50 Hampshire Street
Cambridge, MA 02139
Tel: (617) 452-6000

CONCORD AVENUE

BELMONT, MASSACHUSETTS

CONCEPTUAL RE-USE PLAN PUBLIC WORKS AND BUILDING

PROJECT NO. 19316-66833
FILE NAME: EXST001
SHEET NO. 3

NOT FOR CONSTRUCTION

Langdon Environmental LLC
Two Summer Street, Suite 300
Natick, Massachusetts 01760

November 28, 2016

Mr. Glenn R. Clancy, P.E.
Director of Community Development
Homer Municipal Building
19 Moore Street
Belmont, Massachusetts 02478

Subject: Concord Avenue Landfill – Updated 2016 Closure Cost Estimates and Summary of Costs Incurred to Date

Dear Mr. Clancy:

Langdon Environmental LLC (Langdon) on behalf of the Town of Belmont (Town) has prepared the following summary of the all the costs for closure and post-closure care for the Concord Avenue Landfill site (Landfill). We have included both the past incurred and estimated future costs related to the capping and closure of the Landfill in accordance with the Solid Waste Management Regulations (310 CMR 19.000) promulgated by the Massachusetts Department of Environmental Protection (MassDEP). These costs are as incurred and estimated through June 30, 2016.

To provide a complete summary of the past and future estimated costs for all MassDEP requirements for the Landfill, Langdon prepared the attached summary tables to provide the following:

- Total funds that the Town has expended to date for engineering and environmental assessment as well as funds that have been appropriated by Town Meeting but have not been expended such as the construction cost for demolition of the on-site incinerator building. For the past year, there have been no new costs from the letter prepared for the prior fiscal year (Table One);

- Preliminary estimates of potential costs for the engineering, permitting and construction of a project to remediate wetland sediments around the Landfill should it be required by MassDEP based on the results of the further environmental assessment. Future costs for construction of the final cap meeting MassDEP regulatory requirements (Table Two); and

- Estimates of the costs for the 30-year MassDEP-required post-closure maintenance and monitoring program that will have to be appropriated annually by the Town after completion of the final cap (Table Three).

A summary of all the costs estimated is provided in Table Four. The following is an overview of each of the cost items presented in the attached tables.

Past Expended and Unexpended Appropriated Funds

To date, the Town has spent or committed under contract a total of $522,890 to complete the MassDEP required engineering and environmental assessment work at the Landfill as well as activities related to the survey and appraisal required by the property transfer process. A summary of the funds already appropriated by the Town as well as the funds appropriated but not spent to date is provided in Table One attached to this letter.

Estimated Costs for Demolition and Removal of Incinerator Building

In order to cap the Landfill, the Town needs to demolish and remove the existing inactive incinerator building. Langdon has conducted a hazardous material assessment of the building and developed bidding specifications for its demolition. The construction of the building demolition can proceed once the Town completes the process of finalizing ownership of the property. A breakdown of the $620,000 cost estimate for hazardous material abatement and building demolition is presented in Table One attached.

Potential Costs Related to Wetland Remediation

MassDEP has required that the Town conduct further testing and assessment on wetland sediments around the landfill as well as address the presence of iron flocculent (floc) in the surface water. At this time, the work is on-hold pending access and the final transfer of the property from the Commonwealth to the Town. To provide a preliminary estimate of the potential costs for sediment removal and restoration of the wetland areas, Langdon prepared the costs presented on Table Two. These costs are based on the excavation and removal to an off-site permitted disposal facility of up to 2,000 cubic yards of sediments and the restoration of up to 1.5 acres of impacted wetlands. Langdon has inflated the previous estimate by 3.4% to reflect 2016 costs. Given the current unknowns about the requirements, Langdon has included a 25% contingency on the estimated costs.

The costs shown on Table Two do not include any active groundwater treatment for the iron floc and assume that the sediment removal would be a one-time event. Depending on the extent of the work, sediment excavation and removal may create the requirement for additional permits including the preparation of an Environmental Impact Report (EIR) under the Massachusetts Environmental Policy Act (MEPA) regulations and that the overall project may further increase project costs.

Future Costs for Cap Construction

Langdon has conducted investigations at the site to determine the extent of landfilled areas requiring capping and has broken portions of the site that were historically landfilled into three areas:

- Area A is approximately 4 acres and is located behind the incinerator across the brook. Clay was found over most of Area A. The thickness of clay found should be enough to qualify as the impermeable layer of the cap. The clay will need to be supplemented with sand and loam layers to comply with MassDEP requirements.

- Area B is approximately 10 acres and is the main Landfill area which includes the incinerator and old tree farm. Clay, believed to have been previously placed in Area B, was not found

during prior test pit explorations. Langdon has assumed that all of Area B will have to be capped in accordance with current MassDEP regulations.

- Area C is approximately 3 acres and is currently used for compost operations. Waste was not found in Area C in test pits performed by Langdon and we have assumed that this area will not need to be capped.

The 2013 estimate of cap construction costs was based on a unit cost of $185,000 per acre to construct a cap meeting current MassDEP requirements over Area B. In the same 2013 estimate, the additional capping layers required in Area A were estimated to cost approximately $132,000 per acre. Both of these unit costs were based on recent landfill cap construction projects. These costs are in 2013 construction dollars and have been escalated on the attached Table Two by 8.7% to reflect current (2016) estimated costs.

Because the Town has not received final approval from MassDEP of the final capping plans, Langdon recommends continuing to include a 20% construction contingency for this project. In addition to these costs, Langdon has included allowances for engineering services during construction. The total budget for constructing the cap is $3,309,000 as summarized on the attached Table Two.

This estimate does not include costs for post-closure uses such as athletic fields and Department of Public Works facilities.

Post-Closure Maintenance and Monitoring

The MassDEP regulations require that once the cap is constructed, the Town maintain it for at least a 30-year post-closure period. This work includes periodic mowing of vegetated surfaces, maintenance of the stormwater controls including removal of vegetation in swales and general cap repairs caused by settlement of the underlying waste and erosion. The Town will also be required to provide periodic inspection reports to MassDEP on the condition of the cap. The estimated costs for this work are summarized in the attached Table Three.

In addition to the costs for maintenance and inspections, the Town will be required to continue the sampling of groundwater and surface water at the Landfill. Langdon has assumed a frequency of two rounds of samples each year at an annual cost (2016 dollars) of $30,000 per round. The frequency and extent of the sampling program may be reduced over time (with MassDEP approval) but Langdon recommends that the Town include the cost for the continued program given the status of the Landfill closure process and the proximity of property not owned by the Town to the historically Landfilled waste.

Summary

Table 4 was assembled to provide an overview of the total costs expended and anticipated related to the closure and long-term maintenance and monitoring of the Concord Avenue Landfill. Based on the components discussed and identified above, the total liability cost to the Town for the Landfill closure is approximately $7.52 million.

Please do not hesitate to contact me at my office at (508) 545-0333 or mobile phone at (617) 875-3693 if you have any questions or require anything further.

Sincerely yours

Bruce W. Haskell

Bruce W Haskell, P.E.
Langdon Environmental LLC

Table One
Updated Summary of Estimated Construction Costs for Final Closure of Concord Avenue Landfill
Funds Already Expended and/or Appropriated
Concord Avenue Landfill, Belmont, Massachusetts
November 23, 2016

Cost Item	*Basis*	*Expended or Appropriated Cost*
Past Expenditures and Unexpended Appropriations		
Engineering Contracts	Original Agreement for Initial Site Assessment and Comprehensive Site Assessment (CSA) and Closure Related Site Planning Requirements – 2001 through 2010	$220,446
	Evaluation of Post-Closure Uses of Site – 2014	$15,000
	Contract for design of incinerator building demolition, supplemental field investigations for CAAA in response to MassDEP requirements and closure alternative evaluation (existing contract)	$267,094
	Payment to DCAMM Surveyor for Property Line Survey - 2014	$14,850
	Payment to DCAMM Property Appraiser	$5,500
	Subtotal Existing and Past Engineering and Assessment Costs	**$522,890**
Construction Incinerator Building Demolition	Asbestos and other material abatement at existing incinerator building – 2009 dollars	$145,000
	Building demolition post-abatement – 2009 dollars	$300,000
	Subtotal Building Demolition (2009 dollars)	$445,000
	Escalation – 2009 to 2016 dollars (add 16.4% to 2009 cost)	$72,000
	Subtotal Estimated Construction Cost – 2016 dollars	$517,000
	Contingency (20% of Subtotal Costs)	$103,000
	Total Estimated Building Construction Costs	**$620,000**
SUBTOTAL – PAST EXPENDITURES AND UNEXPENDED APPROPRIATIONS		**$1,142,890**

Notes
1. All estimated costs rounded to nearest $1,000.
2. All expended costs based on amounts invoiced by CDM Smith to the Town of Belmont through December 1, 2014. Costs associated with existing contracts based on not-to-exceed limit of contract.

Table Two
Updated Summary of Estimated Construction Costs for Final Closure of Concord Avenue Landfill
Estimated Costs for Wetland Sediment Remediation and Final Cap Construction
Concord Avenue Landfill, Belmont, Massachusetts
November 23, 2016

Cost Item	Basis	Estimated Cost
Estimated Potential Costs Related to Remediation of Iron Floc and Wetland Sediments		
Permitting and Engineering	Preparation of Environmental Impact Report, Wetland Permits, Corrective Action Design and construction documents for Remediation (Allowance)	$400,000
Construction	Excavation of wetland sediments, dewatering, processing to stabilize, characterization, and off-site transportation and disposal. Assume 2,000 cubic yards (cy) at 1.7 tons/cy and $300 per ton (preliminary estimate)	$1,020,000
	Restoration of impacted wetland restoration area – assume 1.5 acres at $50,000 per acre	$75,000
	Subtotal Costs – 2014 Dollars	$1,495,000
	Escalation (2014 to 2016 Dollars – add 5.7% to 2014 Dollars)	$85,000
	Subtotal Construction Costs – 2016 Dollars	$1,580,000
	Contingency (25% of Subtotal Costs)	$395,000
SUBTOTAL – ESTIMATED POTENTIAL COSTS FOR POTENTIAL CORRECTIVE ACTIONS RELATED TO IRON FLOC AND SEDIMENTS		**$1,975,000**

Estimated Future Appropriations – Design, Permitting and Construction of Final Cap		
Cost Item	Basis	Estimated Cost
Area A Cap	4 acres previously partially capped with clay soil layer. Requires final cap layers above clay at cost of $132k per acre	$528,000
Area B Cap	10 acres requiring new MassDEP cap at $185k per acre	$1,850,000
Area C Cap	No waste identified – No cap required	$0
	Subtotal Cap Construction (2013 Dollars)	$2,378,000
	Escalation (8.7%) from 2013 to 2016 (see note 1)	$207,000
	Subtotal Cap Construction (2016 Dollars)	$2,585,000
	Engineering During Construction (Allowance of 8% of Cap Construction)	$207,000
	Contingency (20% of cap construction subtotal)	$517,000
	SUBTOTAL - ESTIMATED CAP CONSTRUCTION COSTS	**$3,309,000**
TOTAL ESTIMATED AND POTENTIAL COST – CAPPING AND WETLAND SEDIMENT REMEDIATION		**$5,284,000**

Notes:
1. All costs in 2013 dollars, escalation based on the ENR 20 city Construction Cost Index. All costs rounded to nearest $1,000.
2. Costs do not include any post-closure use of site by town (e.g. recreational fields and/or public works operations areas).
3. Designation of capping requirements for have been presented to MassDEP but require their final approval.
4. Costs do not include remediation of groundwater, if required by MassDEP. Costs do not include land acquisition, if required.

Table Three
Updated Summary of Estimated Construction Costs for Final Closure of Concord Avenue Landfill
Estimated Costs for MassDEP Required Post-Closure Monitoring and Maintenance
Concord Avenue Landfill, Belmont, Massachusetts
November 23, 2016

Cost Item	*Basis*	*Estimated Cost*
Estimated Costs for Post-Closure Monitoring and Maintenance		
Post-Closure Monitoring	Annual water quality monitoring – two rounds per year for 30 years. Current cost estimated $30,000 per year	$900,000
Annual Cap Inspections	Assume annual cap inspections by Professional Engineer of final cap and post-closure use including required reporting to MassDEP. Based on $1,500 per year for 30-year post-closure period	$45,000
Cap Maintenance	Allowance for maintenance of final cap including stormwater basins, repair of erosion, removal of burrowing animals, and mowing. Does not include maintenance of post-closure use. Assume allowance of $5,000 per year for 30-year post-closure period.	$150,000
	Subtotal – Post-Closure Maintenance and Monitoring Costs	**$1,095,000**

Table Four
Updated Summary of All Costs (Past and Future) for Final Closure of Concord Avenue Landfill
Belmont, Massachusetts
November 23, 2016

Cost Item (Reference Table)	*Description*	*Estimated Cost*
Summary of Past and Future Costs Related to Landfill Closure		
Engineering Contracts (Table One)	Past expended costs for landfill assessment, evaluation of post-closure uses, and ongoing contract for cap alternative evaluation and demolition of incinerator	$522,890
Incinerator Demolition (Table One)	Estimated construction cost for demolition of incinerator building	$620,000
Potential Costs for Iron Floc and Sediment (Table Two)	Estimated potential costs for permitting and engineering related to the remediation of wetland sediments and iron floc around landfill	$1,975,000
Cap Construction (Table Two)	Construction of cap over areas A (partial) and B (complete)	$3,309,000
Post-Closure Maintenance and Monitoring (Table Three)	MassDEP required site maintenance, inspections and water quality monitoring over minimum 30-year post-closure period	$1,095,000
TOTAL ESTIMATED COSTS FOR LANDFILL CLOSURE AND POST-CLOSURE		**$7,521,890**

See individual Tables 1, 2 and 3 for assumptions and breakdown of estimated costs.

Appendix C
CDM Smith June 2012 Memorandum

Memorandum

To: *Peter Castanino, Director of Public Works*
Glenn Clancy, Director of Community Development

From: *Bruce W. Haskell, P.E.*

Date: *June 15, 2012*

Subject: *Evaluation of Specific Alternative Post-Closure Uses of Concord Avenue Landfill*

As directed by the Board of Selectmen, CDM Smith has been asked to evaluate three potential alternatives for post-closure use of the Concord Avenue Landfill Site: passive recreation, athletic fields, or photovoltaic (PV) solar panels. A prior memorandum, dated February 23, 2012, included a conceptual evaluation of the alternatives considered. The intent of this memorandum is to provide a more detailed summary of the preliminary findings with regard to feasibility, design considerations, and approximate cost of each of the potential alternatives. Additionally, as described in prior memoranda, the cost of the cap may vary based on the post-closure use alternative selected. The implementation of passive recreation or PV solar panels may receive approval for an alternative cap, based on the relatively low frequency and intensity of receptor exposure. Whereas, the implementation of athletic fields will likely require the standard MassDEP regulated cap, further discussed below.

Each of the three potential alternatives described below also includes partial use of the site for public works material storage areas. The estimated cost for implementing public works usage includes roadway construction, stormwater basins, grading, and site security fencing. The proposed security fencing would consist of two security gates: one for general site access and one strictly for DPW access. Additional optional items are presented below for budgetary purposes as well.

Table 1. Public Works Usage Cost Considerations

Item	Unit Cost	Total
Roadway, stormwater, grading, security fencing, etc.	$390,000	$390,000
	Total Base Cost:	**$390,000**
**12" thick reinforced concrete pads beneath all storage bins	$240 per cy	$182,400
**Block walls around storage bins	$60 per sf (new)	$0 Use of Existing Blocks

Notes:

1. Optional items are noted by **.

Alternative 1: Passive Recreation

This alternative is the development of a grassed surface of the site potentially with pathways to access it and the surrounding conservation areas and parking. Because public access is limited in both frequency and time for this use, the Town can likely receive approval of the alternative three-foot thick soil cap. This cap will cost approximately $100,000 to $120,000 per acre to construct (note that the use of an alternative cap requires MassDEP approval). The costs to construct the post-closure use elements such as pathways and parking areas are low and can range from no additional cost to an allowance of $100,000 to include a small parking area and trails. The maintenance requirements for this type of cap include periodic mowing (twice per year) and repairs of any cap requirements. For a landfill this size, the annual maintenance cost for a passive recreation area is estimated at less than $10,000 per year.

Table 2. Passive Recreation Cost Considerations

Item	Unit Cost	Total
Alternative Cap, Engineering, Design, and Permitting	$125,000 per acre (cap only)	$2,530,000[1]
Passive Recreation Implementation	$0 to $100,000	$100,000
Incinerator Building Demolition	$534,000	$534,000
Public Works Usage	$390,000	$390,000
	Total:	**$3,554,000**

Notes:

1. Estimate includes funds previously appropriated at the May 2012 Town Meeting.
2. When calculating cost for capping, a total of 14 acres is assumed.
3. Designation of capping requirements has been presented to MassDEP, but requires their final approval.
4. Refer to CDM Smith memo dated February 23, 2012 for itemized breakdown of capping, engineering, design, and permitting costs.

Alternative 2: Athletic Field(s)

The development of athletic fields is probably the most common use for capped landfill sites. Local examples include Danehy Park in Cambridge, Millennium Park in West Roxbury, Pope John Paul II Park in Dorchester and Skyline Park in Brookline. Each of these sites included at least one large recreational field with appurtenant parking and pathways as well as other small structures including lights, bathroom facilities and playground structures.

Per the request of the Town, CDM Smith prepared two conceptual designs based on the athletic field post-closure use concept. Alternative 2A consists of one large rectangular athletic field (size 225 feet by 360 feet with the appropriate perimeter safe zones) for multi-purpose use, overlain with a softball field. Alternative 2B consists of two softball fields with distinct and separate outfields for simultaneous use. These fields are configured for women's high school use but could be used individually for men's softball if no outfield fences are included. Both alternatives are

presented along with associated parking (58 athletic field parking spaces and an emergency access road with parking for four accessible parking spaces), paved areas, and site security fencing and gates. Estimated costs for additional items (such as area lighting, restroom facilities, perimeter fencing, etc.) are presented as options for consideration.

As requested by the Town, CDM Smith also evaluated two other alternative field configurations for the site. The first was a combination of a softball and baseball field and the second was two baseball fields. As with Alternative 2B discussed above, these fields would not have a shared outfield allowing two games to occur simultaneously. Because of the limited plateau on the landfill, neither of these alternatives would fit on the site without significant additional expense to construct retaining walls and other structures to increase the available flat area. Therefore, these alternatives were not evaluated further.

The following features are presented to provide additional options for the Town to consider:

- Perimeter fencing around athletic fields.
- Artificial turf associated with Alternative 2A, only: softball field with 250 ft foul line and outfield sharing field space with rectangular athletic field.
- 50 foot candle lighting system for athletic fields.
- Restroom building, adjacent to bus turn-around, accommodating 10 latrines.

Plans showing the athletic field concepts 2A and 2B are attached to this memorandum. The final plan to be developed as part of the landfill closure will include the selected amenities and landscaping based on the final design. The estimated cost for each of these features is itemized in Tables 3A and 3B, below, to facilitate selection of desired options. Please note that these costs are for budgetary purposes only and significant work has to be completed to develop a more accurate estimate.

Typically, landfills where athletic fields have been developed have been required by MassDEP to construct a final cap in accordance with MassDEP regulations (cost $175,000 per acre). This cap is required because of the intensive public use of the fields and to limit any potential exposure to the underlying landfilled waste. However, MassDEP may accept an alternative cap consisting of a three foot soil layer for this site given its history and the results of the environmental assessment to date. The type of cap that will be proposed for the site will be based on the results of the further environmental assessment being undertaken by the Town in 2012.

Table 3A. Alternative 2A: Rectangular and Softball Field Cost Considerations

Item	Unit Cost	Total
MassDEP Regulated Cap (Area B), Alternative Cap (Area A), Engineering, Design, and Permitting	$175,000 per acre (Area B) $125,000 per acre (Area A) Cap only	$3,170,000[1]
Field Construction (parking, roads, fields, etc)	$1,102,000	$1,102,000
Incinerator Building Demolition	$534,000	$534,000

Public Works Usage	$390,000	$390,000
	Total Base Cost:	**$5,196,000**
**Artificial Turf and Drainage	$1,100,000	$600,000 ($500,000 loam/irrigation credit from above)
**Field Lighting and Electrical	$570,000	$570,000
**Field Perimeter Fencing	$84,000	$84,000
**Restroom Building	$300,000	$300,000

Notes:

1. Estimate includes funds previously appropriated at the May 2012 Town Meeting.
2. The MassDEP regulated cap is assumed for Area B (10 acres), while an alternative cap is assumed for Area A (4 acres).
3. Designation of capping requirements has been presented to MassDEP, but requires their final approval.
4. Refer to CDM Smith memo dated February 23, 2012 for itemized breakdown of capping, engineering, design, and permitting costs.
5. Optional items are noted by **.
6. Cost assumption for field lighting does not include further geotechnical investigation.

Table 3B. Alternative 2B: Two Softball Fields Cost Considerations

Item	Unit Cost	Total
MassDEP Regulated Cap (Area B), Alternative Cap (Area A), Engineering, Design, and Permitting	$175,000 per acre (Area B) $125,000 per acre (Area A) Cap only	$3,170,000[1]
Field Construction (parking, roads, fields, etc)	$1,295,000	$1,295,000
Incinerator Building Demolition	$534,000	$534,000
Public Works Usage	$390,000	$390,000
	Total Base Cost:	**$5,389,000**
**Artificial Turf and Drainage	NA	NA
**Field Lighting and Electrical	$798,000	$798,000
** Field Perimeter Fencing	$84,000	$84,000
**Restroom Building	$300,000	$300,000

Notes:

1. Estimate includes funds previously appropriated at the May 2012 Town Meeting.
2. The MassDEP regulated cap is assumed for Area B (10 acres), while an alternative cap is assumed for the remainder of the site (4 acres).
3. Designation of capping requirements has been presented to MassDEP, but requires their final approval.
4. Refer to CDM Smith memo dated February 23, 2012 for itemized breakdown of capping, engineering, design, and permitting costs.
5. Optional items are noted by **.
6. Cost assumption for field lighting does not include further geotechnical investigation.

The annual maintenance costs for natural and artificial turf are estimated at $28,000 and $12,500, respectively.

Alternative 3: Photovoltaic (PV) Panels

CDM Smith conducted a solar PV analysis of the site and determined that Area B of the Conceptual Re-use plan is the optimal location for PV panels (refer to Drawing E-1). A ballasted (non-penetrative) type PV mounting system is recommended for the surface of Area B regarded to create a flatter, south-facing surface of the landfill. This type of system utilizes concrete blocks to hold the PV mounting structure in place, eliminating the need for ground penetration supports. The mounting angle for these types of systems usually ranges from zero to twenty degrees, with the greater angle producing more output. The final angle must be determined based on final engineering design and analysis, but twenty degrees is recommended to increase power production.

The conceptual layout is shown on Drawing E-1 and includes a total of 3,619 PV panels with a rated capacity of 1013.32 kW dc (approximately 1 MW). The layout is based on the 280W Suntech poly-crystalline solar panels, four 250 kW Satcon Powergate inverters, 1000 KVA step up transformer, and a 1600A NEMA 3R Switchgear. With this panel selection and local historical high and low temperatures, the solar PV modules will be arranged with 11 panels per string. The solar PV system discussed herein is considered a grid-connected system. In this case, the PV power source would operate in parallel with Belmont Municipal Light directly feeding electricity into the grid during the daylight hours.

During a recent meeting with the Town of Belmont DPW, Community Development, and the Belmont Municipal Light Department (BMLD), it was determined that a Power Purchase Agreement (PPA) is likely the only viable option for a Solar PV Array on the landfill, mainly due to net metering limitations and tax incentives for private companies. In this scenario, the Town of Belmont, BMLD and a privately owned Solar PV Company would enter into a contractual agreement with the considerations outlined below. At a minimum, for the PPA to be viable, the following is necessary:

1. The town of Belmont caps the landfill and leases the land on the landfill to this third party for an agreed upon duration, e.g. 20-30 yrs.

2. BMLD must purchase the solar electricity from the third party for a fixed rate and duration; e.g. (according to BMLD) in order to be cost effective the rate must be $0.05 to $0.08 per kWh for 10-15 years, however current and future rates for solar-generated electricity are estimated to be significantly higher (approximately $0.15).

3. The third party solar PV Company designs, builds, and operates the array.

This PPA arrangement has the potential to be mutually beneficial for all parties involved in the following manner:

1. The solar array will generate revenue for the Solar PV company from the sale of electricity to BMLD and Solar Renewable Energy Certificates (SRECs). One SREC is credited for every is 1,000 kWh or 1 MWh of electricity produced by the Solar PV system. The electricity generated is fed into the electrical grid, and the accompanying SREC can then be sold on the open market. The current value of an SREC is between $0.30 and $0.55 per kWh, but the SREC program is set to expire in 2021. In addition, the private company could take advantage of a 30% tax credit, assuming the system is installed prior to December 31, 2016. Tax credits have trended downward in recent years, and therefore expedited installation is a critical component necessary to optimize this potential benefit.

2. The Town of Belmont could generate revenue from the lease of the land on the landfill.

3. The BMLD would have the ability to purchase power from a reliable renewable energy source in the town, reduce their carbon emission and resell the electricity to their consumers.

Based on recent similar PV systems installed in Massachusetts, the average cost of a fixed-tilt, mounted solar PV system is between $4.5 and $5.5 per Watt. For this 1MW size system, the cost is estimated between $4,500,000 and $5,500,000. This cost includes preliminary estimates for permitting, design, construction, operation and utility interconnection. Below is a summary of the annual solar production and estimated revenue potential.

Table 4. Solar PV Summary

Annual Solar Production (kWh)	Electricity Cost ($/kWh)	Annual Energy Value	SREC Value ($/kWh)	Annual SREC Value (expires in 2021)
1,138,072	0.05	$56,903	$0.30	$341,422
1,138,072	0.08	$91,045	$0.55	$625,940

The solar PV systems at “Area B” on Concord Ave would have very limited O&M requirements because the panels will be cleansed by rain due to the anticipated 20 degree mounting angle. Typically, the annual O&M costs for solar PV systems are $0.01-0.02 per kWh.

As this stage of the project it is difficult to accurately calculate the Net Present Value (NPV) for the project since there are too many unknown variables, e.g. loan interest rate, down payment, SREC value, electricity value and installation cost. In addition, since timeframe is critical in the feasibility of this project due to the tax credit and SREC expiration dates, acting quickly makes this project more viable. Assuming the project is construction by January 2014, the best and worst case NPVs are shown below.

Table 5. Net Present Value

NPV (Best Case)	NPV (Worst Case)
$1,565,600	-$1,200,000

Preliminary analysis confirms that a solar PV Array of 1MW or larger on "Area B" in the Landfill on Concord Ave may be viable for the Town of Belmont. However, feasibility will ultimately be driven by the financial requirements of the Town, BMLD, and the developer. As explained above, the cost at which BMLD would be required to purchase the solar-generated electricity, limits the cost effectiveness of this alternative. If the town wants to further pursue this option, an RFP should be issued to obtain proposals from solar PV vendors

As discussed above, an alternative cap may be implemented, pending MassDEP approval, with the selection of the solar PV panel post-closure use alternative. The following is provided for comparison purposes.

Table 6. Solar PV Panels Cost Considerations

Item	Unit Cost	Total
Alternative Cap, Engineering, Design, and Permitting	$125,000 per acre (cap only)	$2,530,000[1]
Solar Panel Implementation	$0[2]	$0[2]
Incinerator Building Demolition	$534,000	$534,000
Public Works Usage	$390,000	$390,000
	Total Base Cost:	**$3,454,000**

Notes:

1. Estimate includes funds previously appropriated at the May 2012 Town Meeting.
2. The installation of solar panels will be completed by a third-party vendor and will potentially generate revenues to the Town.
3. When calculating cost for capping, a total of 14 acres is assumed.
4. Designation of capping requirements has been presented to MassDEP, but requires their final approval.

We are available to meet with you to discuss this further and respond to any questions you may have. Please do not hesitate to contact me with any questions or comments.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY:
DRAWN BY:
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY:
DATE: JANUARY 2012

CDM Smith
50 Hampshire Street
Cambridge, MA 02139
Tel: (617) 452-6000

CONCORD AVENUE

BELMONT, MASSACHUSETTS

CONCEPTUAL RE-USE PLAN PUBLIC WORKS AND RECREATION

PROJECT NO. 19316-66833
FILE NAME: EXST001
SHEET NO. 2

NOT FOR CONSTRUCTION

SOFTBALL SUN ANGLE ORIENTATION

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY:
DRAWN BY:
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY:
DATE: JANUARY 2012

CDM Smith
50 Hampshire Street
Cambridge, MA 02139
Tel: (617) 452-6000

CONCORD AVENUE

BELMONT, MASSACHUSETTS

CONCEPTUAL RE-USE PLAN
PUBLIC WORKS AND RECREATION

PROJECT NO. 19316-66833
FILE NAME: EXST001
SHEET NO. 2

NOT FOR CONSTRUCTION

PHOTOVOLTAIC PLAN

PLAN

1" = 50'

25 0 50

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY:
DRAWN BY:
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY:
DATE: JANUARY 2012

CDM Smith
50 Hampshire Street
Cambridge, MA 02139
Tel: (617) 452-6000

CONCORD AVENUE

BELMONT, MASSACHUSETTS

BELMONT
CONCEPTUAL PHOTOVOLTAIC PLAN

PROJECT NO. 19316-66833
FILE NAME: E001SITE

SHEET NO.
E-1

NOT FOR CONSTRUCTION

Appendix D
Presentation to Selectmen – June 18, 2012

Post-Closure Use Alternatives for Concord Avenue Landfill Site

Town of Belmont

Presentation to Board of Selectmen

June 18, 2012

Post-Closure Alternatives

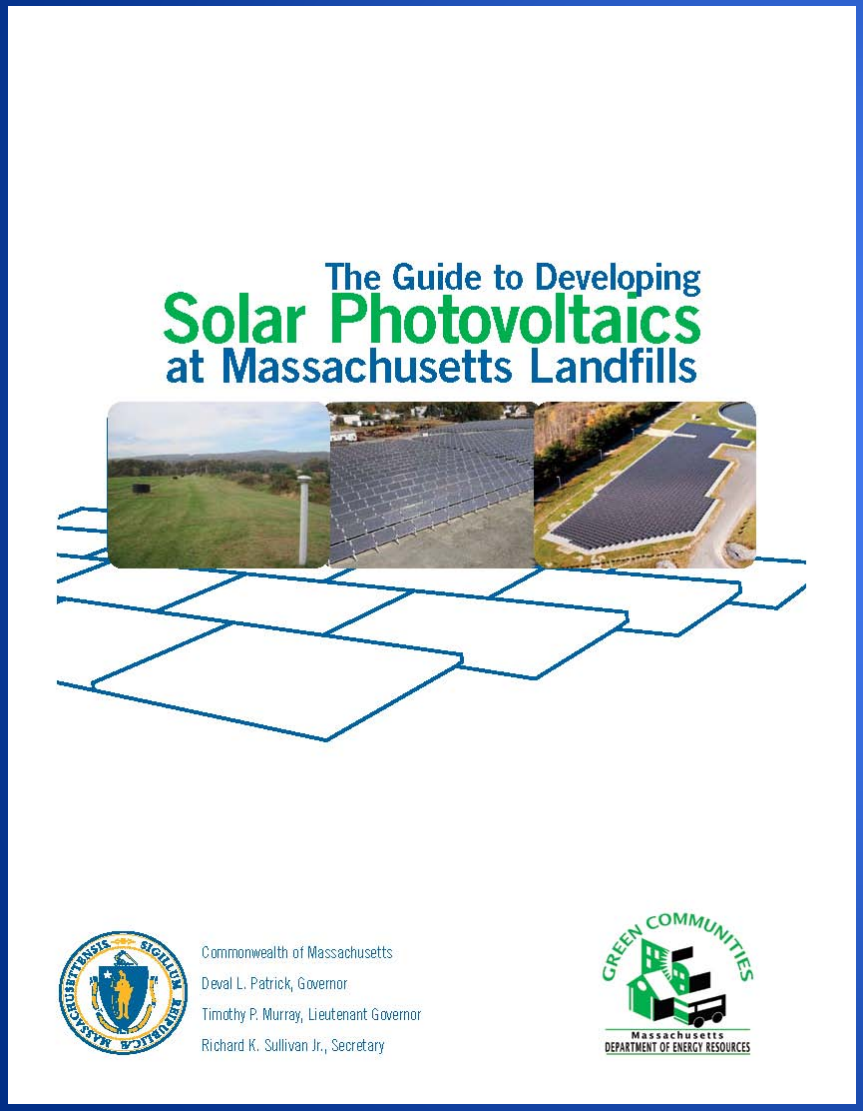
- Based on March 5th meeting with BOS:
  - Passive recreation/open space
  - Active recreational fields
    - Combination rectangular and softball fields
    - Two softball fields – no shared outfield
    - One softball field and one baseball field (not enough room)
    - Two baseball fields (not enough room)
  - Solar Photovoltaic (PV) System
- All alternatives include portion of site set aside for public works operations

Passive Recreation Alternative

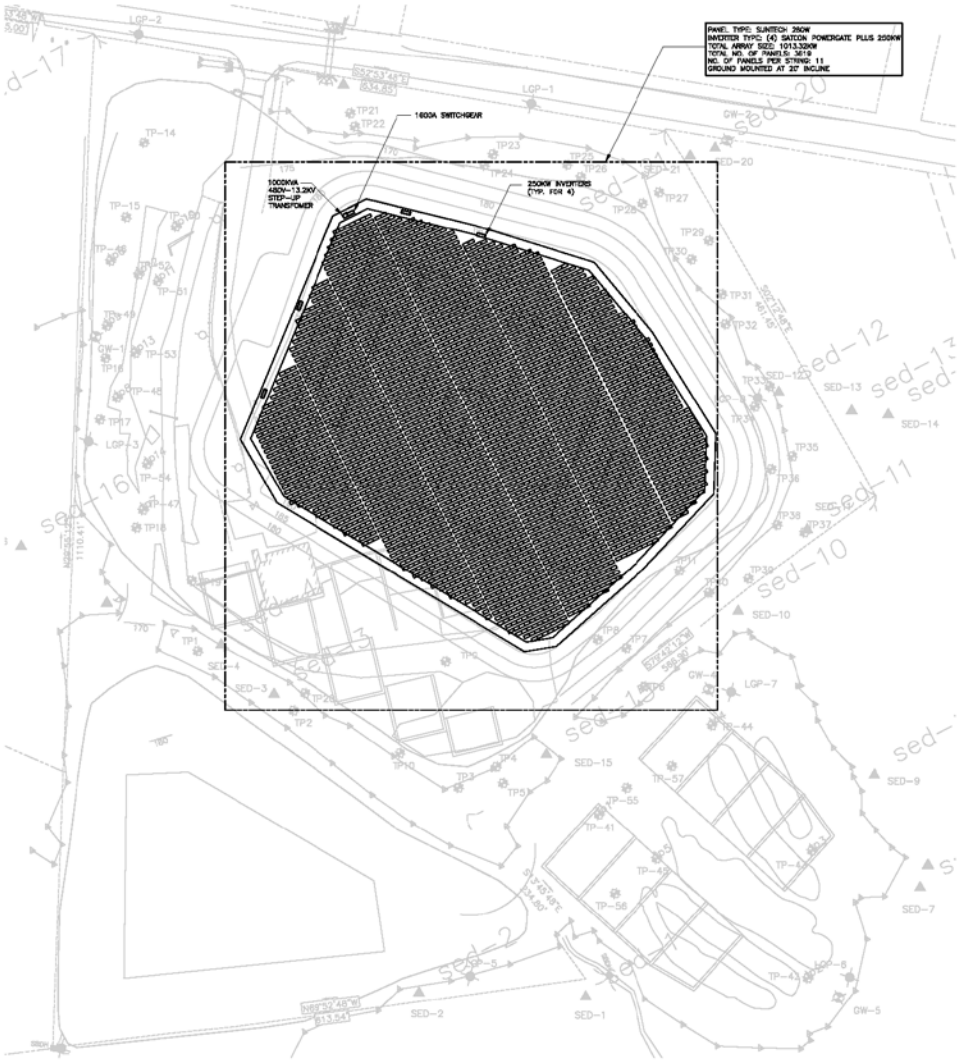
- Alternative cap likely
- Minimally developed with grassy pathways, parking and DPW uses
- Total estimated cost: $3.5 (includes funds previously appropriated at May 2012 Town Meeting)

Lincoln Road Landfill, Walpole

Solar PV Panel Installation



- Preliminary estimates 1 MW rated output
- Requires Power Purchase Agreement between BMLD and private third party
- Not likely financially viable
- Requires RFP to evaluate viability further



PHOTOVOLTAIC PLAN

PLAN

1" = 50'

25 0 50

REV NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY:
DRAWN BY:
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY:
DATE: JANUARY 2012

CDM Smith
One Cambridge Place
50 Hampshire Street
Cambridge, MA 02139
TEL (617) 452-6000

CONCORD AVENUE

BELMONT, MASSACHUSETTS

BELMONT
CONCEPTUAL PHOTOVOLTAIC PLAN

PROJECT NO. 18310-66833
FILE NAME: E201STE
SHEET NO.
E-1

NOT FOR CONSTRUCTION

Recreational Field(s) Alternatives

Rectangular playing field with softball overlay*

- Robust cap likely required
- Rectangular field (225’ by 360’) Softball overlay (250’ foul line)
- Parking, security fences/gates, and DPW uses included
- Total estimated cost: $5.2M**

Two softball fields for simultaneous play*

- Robust cap likely required
- Two softball fields with distinct and separate outfields (200’ foul line)
- Parking, security fences/gates, and DPW uses included
- Total estimated cost: $5.4M**

* Optional items include: restroom facilities, artificial turf, field lighting, and field perimeter fencing

** Includes funds previously appropriated at May 2012 Town Meeting


LEGEND
CONCORD AVE.
STORMWATER
BELMONT
WALTHAM
CONCORD AVENUE
BELMONT, MASSACHUSETTS
CONCEPTUAL RE-USE PLAN
PUBLIC WORKS AND RECREATION
2
NOT FOR CONSTRUCTION

REV. NO.	DATE	DRAWN	CHKD	REMARKS

DESIGNED BY:
DRAWN BY:
SHEET SHKT BY:
CROSS CHK'D BY:
APPROVED BY:
DATE: JANUARY 2013

CDM Smith
75 Hampshire Street
Cambridge, MA 02139
Tel: (617) 452-6000

CONCORD AVENUE

BELMONT, MASSACHUSETTS

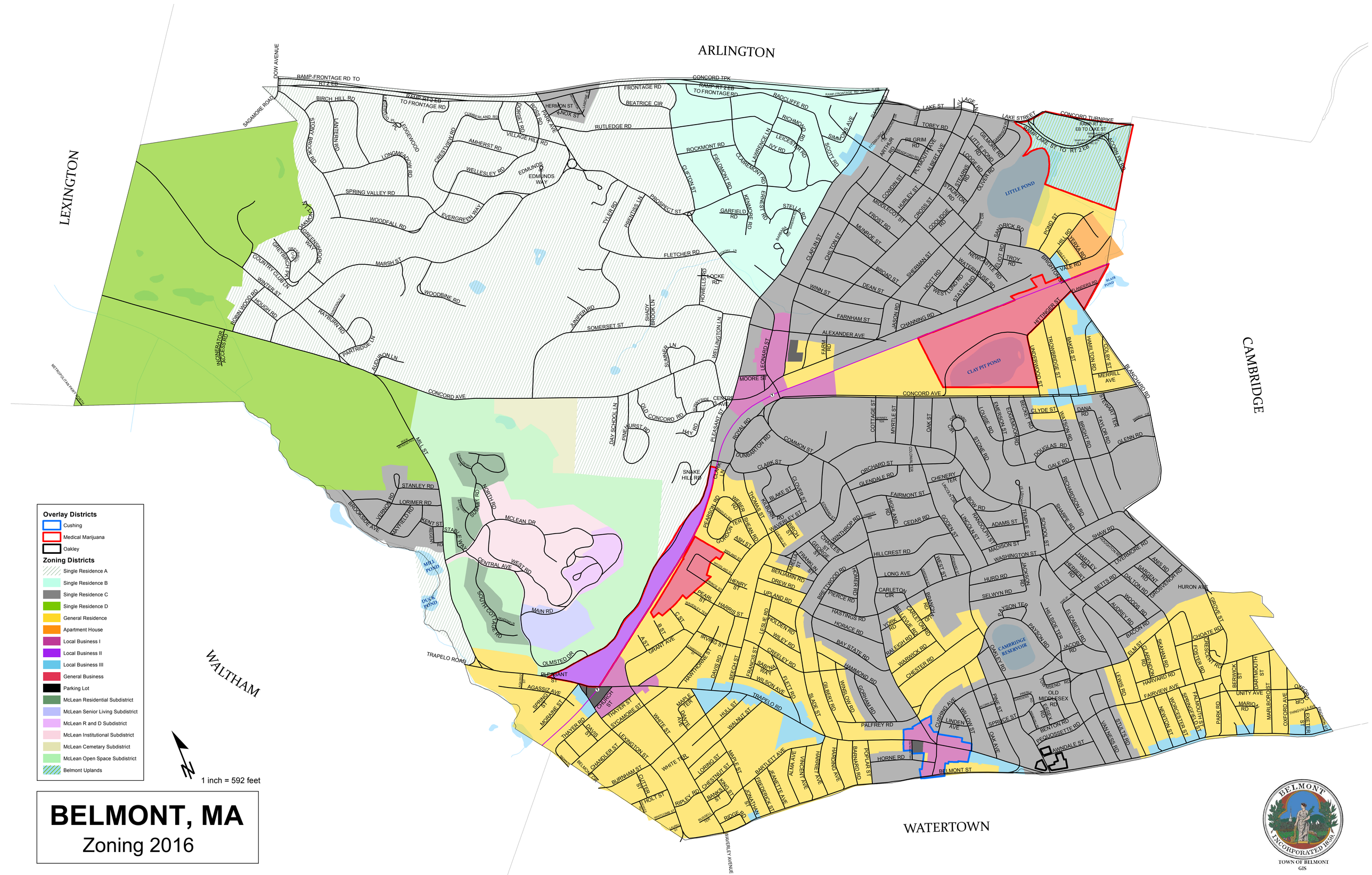
CONCEPTUAL RE-USE PLAN
PUBLIC WORKS AND RECREATION

PROJECT NO. 193-6-61833
FILE NAME: EXS1001

SHEET NO.
2

NOT FOR CONSTRUCTION

Appendix E
Relevant Town of Belmont Zoning Regulations


ARLINGTON
LEXINGTON
CAMBRIDGE
WALTHAM
WATERTOWN
Overlay Districts
Cushing
Medical Marijuana
Oakley
Zoning Districts
Single Residence A
Single Residence B
Single Residence C
Single Residence D
General Residence
Apartment House
Local Business I
Local Business II
Local Business III
General Business
Parking Lot
McLean Residential Subdistrict
McLean Senior Living Subdistrict
McLean R and D Subdistrict
McLean Institutional Subdistrict
McLean Cemetary Subdistrict
McLean Open Space Subdistrict
Belmont Uplands
1 inch = 592 feet
BELMONT, MA
Zoning 2016
TOWN OF BELMONT
GIS

SECTION 2. DISTRICTS

2.1 Classes

The Town of Belmont is hereby divided into 13 classes of Districts:

Single Residence A	Local Business I
Single Residence B	Local Business II
Single Residence C	Local Business III
Single Residence D	General Business
General Residence	Parking Lot
Apartment House	McLean District *
	Belmont Uplands District **

*** Note: §2.1 was amended by Article 5 at the 2002 Special Town Meeting*.
** Note: §2.1 was amended by Article 2 at the 1999 First Special Town Meeting*.

2.2 Location

Said districts are located and bounded as shown on the Zoning Map of the Town of Belmont dated March 14, 1955, as amended which is on file with the Town Clerk. Said map with all explanatory matter thereon accompanies this By-Law and is hereby declared to be part hereof.

2.3 Boundaries

2.3.1 Street Boundaries

The boundaries between Districts are, unless otherwise indicated, the centerlines of such streets, alleys, parkways, or railroads through which the boundary lines run.

2.3.2 Mid-block Boundaries

Unless otherwise specified, a boundary line within a block less than 200 feet wide is a median line between the street lines of said block. Where a block is 200 feet or more in width, the boundary line between Districts as indicated shall be 100 feet from the less restricted side of the block.

2.4 Floodplain District Delineation

The Floodplain District is herein established as an overlay district. The District includes all special flood hazard areas within the Town of Belmont designated as Zone A and AE, on the Middlesex County Flood Insurance Rate Map (FIRM) issued by the Federal Emergency Management Agency (FEMA) for the administration of the National Flood Insurance Program. The map panels of the Middlesex County FIRM that are wholly or partially within the Town of Belmont are panel numbers 25017C0412E, 25017C0414E, 25017C0416E, 25017C0418E and 25017C0419E dated June 4, 2010. The exact boundaries of the District may be defined by the 100-year base flood elevations shown on the FIRM and further defined by the Middlesex County Flood Insurance Study (FIS) report dated June 4, 2010. The FIRM and FIS report are incorporated herein by reference and are on file with the Town Clerk.

Note: §2.4 was amended by Article 24 at the 2010 Annual Town Meeting.

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SECTION 3. USE REGULATIONS

3.1 General Requirements

No building structure shall be erected, altered or used and no premises shall be used for any purpose or in any manner other than as regulated by Section 3.2, Interpretation, and as permitted and set forth in Section 3.3, Schedule of Use Regulations, herein and in accordance with the following notation:

Y	(Yes)	- Use Permitted
SP	(Special Permit)	- Use allowed under a Special Permit by the designated Special Permit Granting Authority.
		Note: §3.1 was amended by Article 28 at the 2006 Annual Town Meeting
SPS	(Special Permit: Size)	- Use permitted, except requiring a Special Permit if new construction, additions or alterations result in more than 5,000 square feet gross floor area in any one or more business uses (as categorized in Section 3.3) on a lot or set of contiguous lots in the same ownership at any time subsequent to June 1, 1987, except for individual additions or alterations increasing floor area in business use on the lot or set of lots by less than 10%.
N	(No)	- Use Prohibited

Uses permitted and uses allowed on Special Permit shall be in conformity with all the density and dimensional regulations and any other pertinent requirements of this By-Law.

3.2 Interpretation

Where a use might be classified under more than one of the following categories, the more specific category shall determine permissibility. If equally specific, the more restrictive category shall govern. A use not classifiable under any listed category may be allowed only by Special Permit from the Board of Appeals, upon the Board's determination that the use is similar in its impacts on the neighborhood, the environs and the Town to a use which is permitted or allowed on Special Permit, and also that the test of Section 7.4.3, Special Permit Criteria, is met.

3.3 Schedule of Use Regulations

USES	DISTRICTS							
	SR-A,B,C,D	GR	AH	LB I	LB II	LB III	GB	PL
AGRICULTURE								
Keeping of livestock other than domestic pets	SP	SP	N	N	N	N	Y	N
Other agriculture	Y	Y	Y	Y	Y	Y	Y	Y
BUSINESS								
Note: See §3.5, Major Development, for business uses involving more than 40,000 square feet floor area								
Commercial off-street parking lots	N	N	N	N	N	N	SPS	SP
Motor vehicle repair, sales, and rental	N	N	N	N	SP	N	SP	N
Motor vehicle service station (see §6.7)	N	N	N	N	SP	N	SP	N
Motorized equipment sales, service and rental including equipment powered by internal combustion engine over 10 hp	N	N	N	N	SPS	N	SPS	N
Catering Service:								
➢ Up to 5,000 square feet	N	N	N	Y	Y	Y	N	N
➢ More than 5,000 square feet	N	N	N	SP	SP	SP	N	N
Note: §3.3 was amended by Article 10 at the 2003 Special Town Meeting.								
Restaurant:								
➢ Up to 10,000 square feet	N	N	N	Y	Y	SP	SP	N
➢ More than 10,000 square feet	N	N	N	SP	SP	SP	SP	N
Note: §3.3 was amended by Article 10 at the 2003 Special Town Meeting.								
Restaurant, Fast Food *Note: §3.3 was amended by Article 10 at the 2003 Special Town Meeting.*	N	N	N	SP	SP	SP	SP	N
Restaurant, Take Out *Note: §3.3 was amended by Article 10 at the 2003 Special Town Meeting.*	N	N	N	N	SP	SP	SP	N
Place of assembly, amusement, or athletic exercise	N	N	N	SP	SP	N	SPS	N
Other retail sales and services	N	N	N	SPS	SPS	SPS	SPS	N

3.3 Schedule of Use Regulations

USES	DISTRICTS							
	SR-A,B,C,D	GR	AH	LB I	LB II	LB III	GB	PL
BUSINESS (Continued)								
Office	N	N	N	SPS	SPS	SPS	SPS	N
Manufacturing or fabrication of products of which the major portion is to be sold at retail on the premises and not more than 8 operatives are employed in the manufacturing or fabrication process	N	N	N	SPS	SPS	SPS	SPS	N
Other manufacturing and warehousing	N	N	N	N	N	N	SPS	N
Wireless Telecommunications Facility (see §6.8) *Note: §3.3 was amended by Article 27 at the 1998 Annual Town Meeting.*	SP	SP	SP	SP	SP	SP	SP	SP
Solar Energy System (See §4.3.8) *Note: §3.3 was amended by Article 9 at the 2012 Special Town Meeting.*	N	N	N	SP	SP	SP	SP	N
Kennels (Commercial or Nonprofit):								
➢ Daycare - the provision of day time services for the care of animals that does not include overnight boarding provided that a minimum of 60 square feet of play area is available per dog.	N	N	N	N	N	SP	SP	N
➢ Boarding	N	N	N	N	N	N	SP	N
➢ Commercial Breeder	N	N	N	N	N	N	N	N
➢ Veterinary	N	N	N	N	N	N	N	N
The Planning Board shall be the SPGA for Kennels *Note: §3.3 was amended by Article 9 at the 2014 Annual Town Meeting.*								
Registered Marijuana Dispensary (See §6E) *Note: §3.3 was amended by Article 12 at the 2014 Annual Town Meeting.*	N	N	N	N	SP	N	SP	N

3.3 Schedule of Use Regulations

USES	DISTRICTS							
	SR-A,B,C,D	GR	AH	LB I	LB II	LB III	GB	PL
PUBLIC AND SEMI-PUBLIC								
Religious or educational use exempted from prohibition by Massachusetts General Law, Chapter 40A, Section 3	Y	Y	Y	Y	Y	Y	Y	Y
Private school conducted for profit, including nursery, dancing and music schools	SP	SP	N	Y	Y	SP	Y	N
Day care center *Note: §3.3 was amended by Article 28 at the 2006 Annual Town Meeting.*	Y	Y	Y	Y	Y	Y	Y	N
Family day care home *Note: §3.3 was amended by Article 28 at the 2006 Annual Town Meeting.*	SP	SP	SP	SP	SP	SP	SP	N
Child Care, Large Family *Note: §3.3 was amended by Article 6 at the 1999 Second Special Town Meeting.*	SP	SP	SP	SP	SP	SP	SP	N
Hospital or sanitarium	SP	SP	N	N	N	N	N	N
Philanthropic use	SP	SP	N	Y	Y	Y	Y	N
Private club or lodge owned by members and customarily conducted as a nonprofit activity:								
➢ operated for members only	SP	SP	N	Y	Y	SP	Y	N
➢ other	N	N	N	Y	Y	SP	Y	N
Municipal recreational use	Y	Y	Y	Y	Y	Y	Y	N
Municipal cemetery	SP	SP	N	N	N	N	Y	N
Other municipal use	SP	SP	SP	Y	Y	Y	Y	Y
School-aged child care home *Note: §3.3 was amended by Article 39 at the 1994 Annual Town Meeting.*	SP	SP	SP	SP	SP	SP	SP	N

3.3 Schedule of Use Regulations

USES	DISTRICTS							
	SR-A,B,C,D	GR	AH	LB I	LB II	LB III	GB	PL
RESIDENTIAL								
Detached single-family dwelling (See §6D for the GR Districts) *Note: §3.3 was amended by Article 14 at the 2014 Annual Town Meeting.*	Y	Y	N	SP	SP	SP	N	N
Two-family dwelling (See §6D for the GR Districts) *Note: §3.3 was amended by Article 14 at the 2014 Annual Town Meeting.*	N	SP	Y	SP	SP	SP	N	N
Conversion of large public buildings or public or private school buildings:								
➢ With 10,000 square feet of gross floor area or less (see §6.3B)	SP	SP	SP	Y	SP	SP	SP	N
➢ With more than 10,000 square feet of gross floor area (see §6.3A) *Note: §3.3 was amended by Article 5 at the 2005 Special Town Meeting.*	SP	SP	SP	SP	SP	SP	SP	N
Elderly housing (see §6.4)	SP	SP	SP	N	N	N	N	N
Cluster development (see §6.5)	SP	N	N	N	N	N	N	N
Other apartment house	N	N	SP	N	N	N	N	N

3.3 Schedule of Use Regulations

USES	DISTRICTS							
	SR-A,B,C,D	GR	AH	LB I	LB II	LB III	GB	PL
ACCESSORY USES								
Home occupation (see §3.4.2)	Y	Y	Y	Y	Y	Y	Y	N
Lodging and Boarding								
➢ for daily or weekly periods	SP	SP	SP	Y	Y	Y	Y	N
➢ for longer periods only	Y	Y	N	Y	Y	Y	Y	N
Mixed-Use – provided that at a minimum the first floor is to be reserved for commercial use and that the residential use comply with §6.10, Inclusionary Housing *Note: §3.3 was amended by Article 17 at the 2007 Annual Town Meeting.* *Note: §3.3 was amended by Article 26 at the 2003 Annual Town Meeting.*	N	N	N	SP	SP	SP	N	N
A noncommercial greenhouse; a tool shed used for the storage of tools, yard and household equipment or other similar accessory buildings (see §4.3.5) *Note: §3.3 was amended by Article 28 of the 2006 Annual Town Meeting.*	Y	Y	Y	N	N	N	Y	N
Commercial provision for the care and recreation of dogs in completely fenced-in area for not more than one hour per day. The Board of Appeals shall consider the size and relationship of the lot to adjacent residential lots, and shall determine whether that size and relationship is adequate to accommodate the use without imposing undue noise, visual, and traffic impacts on the adjacent residential lots; it shall, after (and if) making a determination of the adequacy, impose such conditions on hours of use, number of animals accommodated at a given time, fencing, screening or other measures to contain the activity and minimize its impacts *Note: §3.3 was amended by Article 29 at the 1995 Annual Town Meeting.*	SP	N	N	N	N	N	N	N
Personal Kennel *Note: §3.3 was amended by Article 9 at the 2014 Annual Town Meeting.*	SP	N	N	N	N	N	N	N

3.3 Schedule of Use Regulations

USES	DISTRICTS							
	SR-A,B,C,D	GR	AH	LB I	LB II	LB III	GB	PL
ACCESSORY USES (Continued)								
Swimming pools and tennis courts and other similar recreational facilities (see §6.1)	Y	Y	SP	SP	SP	SP	N	N
Windmills	SP	SP	N	SP	SP	SP	SP	N
A garage for more than 3 vehicles or containing more than 660 square feet floor area	SP	SP	SP	Y	Y	Y	Y	Y
Open lot storage or parking of a boat, boat trailer, house trailer, camping trailer, motor home, commercial trailer, or commercial vehicle *Note: §3.3 was amended by Article 27 at the 2001 Annual Town Meeting.*	SP	SP	N	Y	Y	Y	Y	N
Open lot parking for not more than 3 vehicles accessory to a single-family dwelling, and not more than 2 vehicles per dwelling unit or 5 vehicles per structure for other dwellings	Y	Y	Y	Y	Y	Y	Y	Y
Open lot parking in excess of the above accessory to residential use	SP	SP	Y	Y	Y	Y	Y	Y
Shared Institutional Parking:								
➢ By Town departments	Y	Y	Y	Y	Y	Y	Y	N
➢ Residential overnight parking	Y	Y	Y	Y	Y	Y	Y	N
➢ Pick-up/drop-off of less than 30 minutes	Y	Y	Y	Y	Y	Y	Y	N
➢ Public or private event parking of less than 24 hours	Y	Y	Y	Y	Y	Y	Y	N
➢ Day time use (6 am – 6 pm) by employees and/or customers using less than 30 spaces or 50% of the spaces in the lot, whichever is greater	Y	Y	Y	Y	Y	Y	Y	N
➢ Day time use of more than 30 spaces or more than 50% of spaces in the lot, whichever is greater	SP	SP	SP	Y	Y	Y	Y	N
➢ Evening use (6 pm – 6 am) by customers and/or employees	SP	SP	SP	Y	Y	Y	Y	N
➢ Use by commercial vehicles	SP	SP	SP	Y	Y	Y	Y	N
Note: §3.3 was amended by Article 30 at the 2009 Annual Town Meeting.								

3.3 Schedule of Use Regulations

USES	DISTRICTS							
	SR-A,B,C,D	GR	AH	LB I	LB II	LB III	GB	PL
ACCESSORY USES (Continued)								
Satellite antenna with a receiving dish with a visually coherent surface of 8.5 square feet or less or a diameter of one meter (39.37") or less (see §4.3.5) *Note: §3.3 was amended by Article 18 at the 1999 Annual Town Meeting.* *Note: §3.3 was amended by Article 26 at the 1996 Annual Town Meeting.*	Y	Y	Y	Y	Y	Y	Y	Y
Satellite antenna with a receiving dish with a visually coherent surface of 34 square feet or less or a diameter of two meters or less (see §4.3.5) *Note: §3.3 was amended by Article 18 at the 1999 Annual Town Meeting.* *Note: §3.3 was amended by Article 25 at the 1996 Annual Town Meeting.*	SP	SP	SP	Y	Y	Y	Y	SP
Satellite antenna with a receiving dish with a visually coherent surface of more than 34 square feet or a diameter of more than two meters (see §4.3.5) *Note: §3.3 was amended by Article 18 at the 1999 Annual Town Meeting.* *Note: §3.3 was amended by Article 25 at the 1996 Annual Town Meeting.*	SP	SP	SP	SP	SP	SP	SP	SP
Other uses customarily incidental to the principal uses herein	SP	SP	SP	Y	Y	Y	Y	Y
Interior Wireless Telecommunications Facility (see §6.8 and §7.3) *Note: §3.3 was amended by Article 28 at the 1998 Annual Town Meeting.*	Y	Y	Y	Y	Y	Y	Y	Y
Other Wireless Telecommunications Facility (see §6.8) *Note: §3.3 was amended by Article 28 at the 1998 Annual Town Meeting.*	SP	SP	SP	SP	SP	SP	SP	SP
Solar Energy System (see §4.3.8) *Note: §3.3 was amended by Article 9 at the 2012 Special Town Meeting.*	Y	Y	Y	Y	Y	Y	Y	Y
Shared Driveway (See §5.1.3 k)) *Note: §3.3 was amended by Article 11 at the 2014 Annual Town Meeting.*	SP	SP	SP	Y	Y	Y	Y	N

3.4 Accessory Uses

3.4.1 Accessory Research or Scientific Development

Uses, whether or not on the same parcel as activities permitted as a matter of right, accessory to activities permitted as a matter of right, which activities are necessary in connection with scientific research or scientific development or related production, may be allowed upon the issuance of a Special Permit provided the Board of Appeals finds that the proposed accessory use does not substantially derogate from the public good.

3.4.2 Home Occupations

Note: §3.4.2 was amended by Article 30 at the 1995 Annual Town Meeting.

Home occupations are permitted within a dwelling, but are not permitted in accessory buildings unless granted a Special Permit pursuant to Section 6.11 subject to the following:

Note: §3.4.2 was amended by Article 31 at the 2009 Annual Town Meeting.

a) there is no exterior display or visible storage of supplies or equipment to be used on or off the premises or other variation from the residential character of the premises,

b) no more than one third of the habitable floor area of the residence is to be used for home occupations,

c) not more than one person who is not a member of the household is employed on the premises in the home occupations,

d) the production of offensive noise, vibration, odors, fumes, smoke, dust or other particulate matter, heat, humidity, glare, or other objectionable effects shall be prohibited,

e) no articles are sold or offered for sale on the premises,

f) traffic generated, including pick up and deliveries, does not exceed that normally expected in that residential neighborhood, and

g) all parking required to service home occupations is provided for off-street, other than within a required front yard.

h) If a home occupation results in patrons or clients visiting the premises or if there is a sign indicating the occupation, such home occupation is allowable only upon Special Permit acted on by the Board of Appeals under the criteria in Section 7.4.3 of the Zoning By-Law.

i) A Certificate of Occupancy is required prior to establishing a home occupation, or re-establishing one following termination, and shall be issued for a period of no greater than four years, to be extended only following determination by the Building Inspector that the use continues to comply with the Zoning By-Law.

Note: §3.4.2.i) was amended by Article 10 at the 2014 Annual Town Meeting.

Upon transfer of any beneficial interest in property in which alterations for a home occupation have been made, a Certificate of Compliance must be provided by the owner indicating that either there will be continued compliance with these provisions or that the home occupation is not to be continued.

3.5 Major Development

3.5.1 Applicability

Business developments as authorized in Section 3.3, Schedule of Use Regulations, require Concept Plan approval by Town Meeting under provisions of this Section prior to submittal for a Special Permit by the Board of Appeals, if resulting in more than 40,000 square feet gross floor area in any one or more business uses (as categorized in Section 3.3) on a lot or set of contiguous lots in the same ownership at any time subsequent to June 1, 1987, except for individual additions or alterations totaling less than 10% of the resultant gross floor area on the lot or set of lots.

3.5.2 Concept Plan Approval

Concept Plan Approval shall be by two-thirds vote of the Town Meeting, approving the Plan and a finding that the Plan, subject to such conditions or limitations as the Town Meeting may stipulate, provides benefits to the Town which outweigh any adverse effects for the Town or the vicinity, after consideration of the criteria specified in Section 7.4.3.

Special Permits shall then be required, and shall be approved by the Board of Appeals only upon determination by that Board that the proposal is consistent with the approved Concept Plan, or in the event of an inconsistency, that the departure is necessitated by changed conditions or earlier error, and that the inconsistency does not result in less beneficial development, based on the considerations of Section 7.4.3, Special Permit Criteria.

3.5.3 Procedures

a) Submittal. Five copies of the Concept Plan shall be filed with the Planning Board at least 60 days prior to the date of Town Meeting vote.

b) Concept Plan Contents. A Concept Plan shall consist of the following:

   1) A schematic development plan, indicating boundaries of the lot, buildings, roads, drives, parking, reserved open space, existing topography and proposed grading, areas of retained vegetation and proposed planting areas, and a locus plan showing relation to nearby streets, zoning district boundaries, and water bodies.

   2) Floor plans and elevations of all existing and proposed structures.

   3) Materials indicating the proposed ultimate floor area in each use; time schedule for development; service improvements proposed at the developer's and those anticipated at the Town's expense.

   4) An estimate of peak hour vehicle trips onto and off of the site.

   5) Analysis indicating degree of consistency with each of the considerations of Section 7.4.3, Special Permit Criteria.

c) Study Model. Applicants are encouraged to provide a study model of the proposal for display prior to and at hearings and the Town Meeting.

3.5.4 Pre-Town Meeting Hearing

Prior to Town Meeting action, the Planning Board shall hold a public hearing on the Concept Plan with timing, notice and procedures the same as those required for a hearing on a Special Permit. In addition, the applicant shall be required to post conspicuous notice on the premises indicating the nature of the proposal and time and place of the hearing. The Planning Board shall report its recommendation to the Town Meeting, with a copy of the Concept Plan and the recommendation to be filed with the Town Clerk not less than 14 days prior to the Town Meeting vote on the Concept Plan.

3.5.5 Special Permit

Application for an initial Special Permit must be made not more than 12 months after the Town Meeting approval of the Concept Plan.

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Appendix F
Presentation to Selectmen – November 3, 2014

Town of Belmont

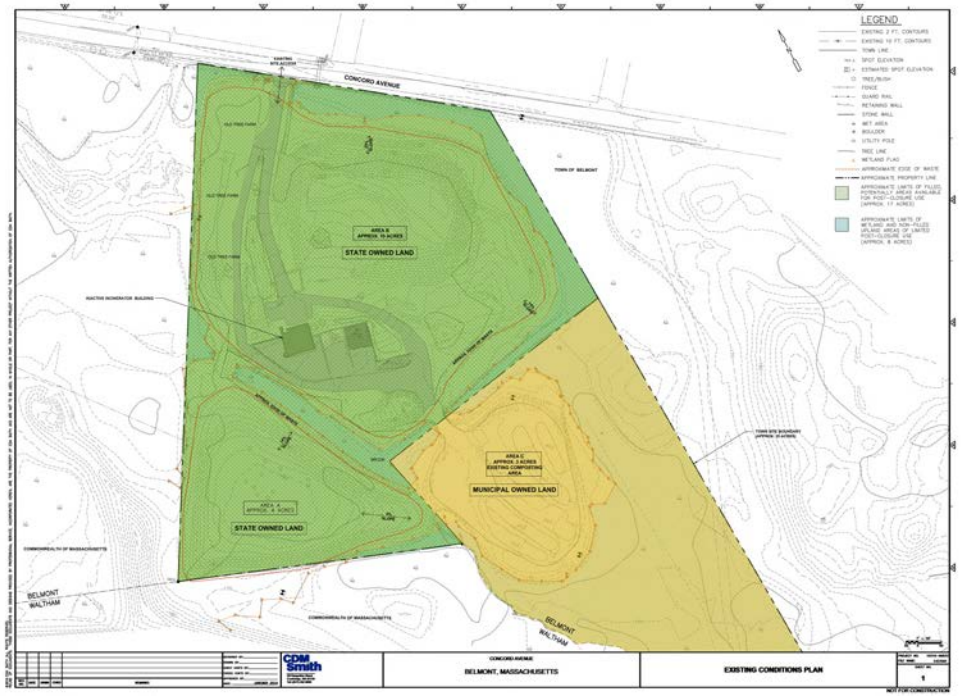
Potential Post-Closure Uses of Concord Avenue Landfill Site

November 3, 2013

CDM Smith

Introduction

- Town proceeding with purchase of front parcel from State
  - Process outlined in legislation
  - Ongoing survey and appraisal
  - Future use limited to town purposes
- Continue discussions for future use of entire capped landfill site
  - Town-owned parcel not limited to municipal uses



Overview of Process to Select Use of Concord Avenue Landfill Site

Explore options for site uses

- *Technically feasible*
- *Regulatory requirements and limitations*
- *Town needs and preferences*
- *Cost*

Present potential site uses and continue process of selection of preferred alternative

Select future use of site.

Area B at Landfill Site

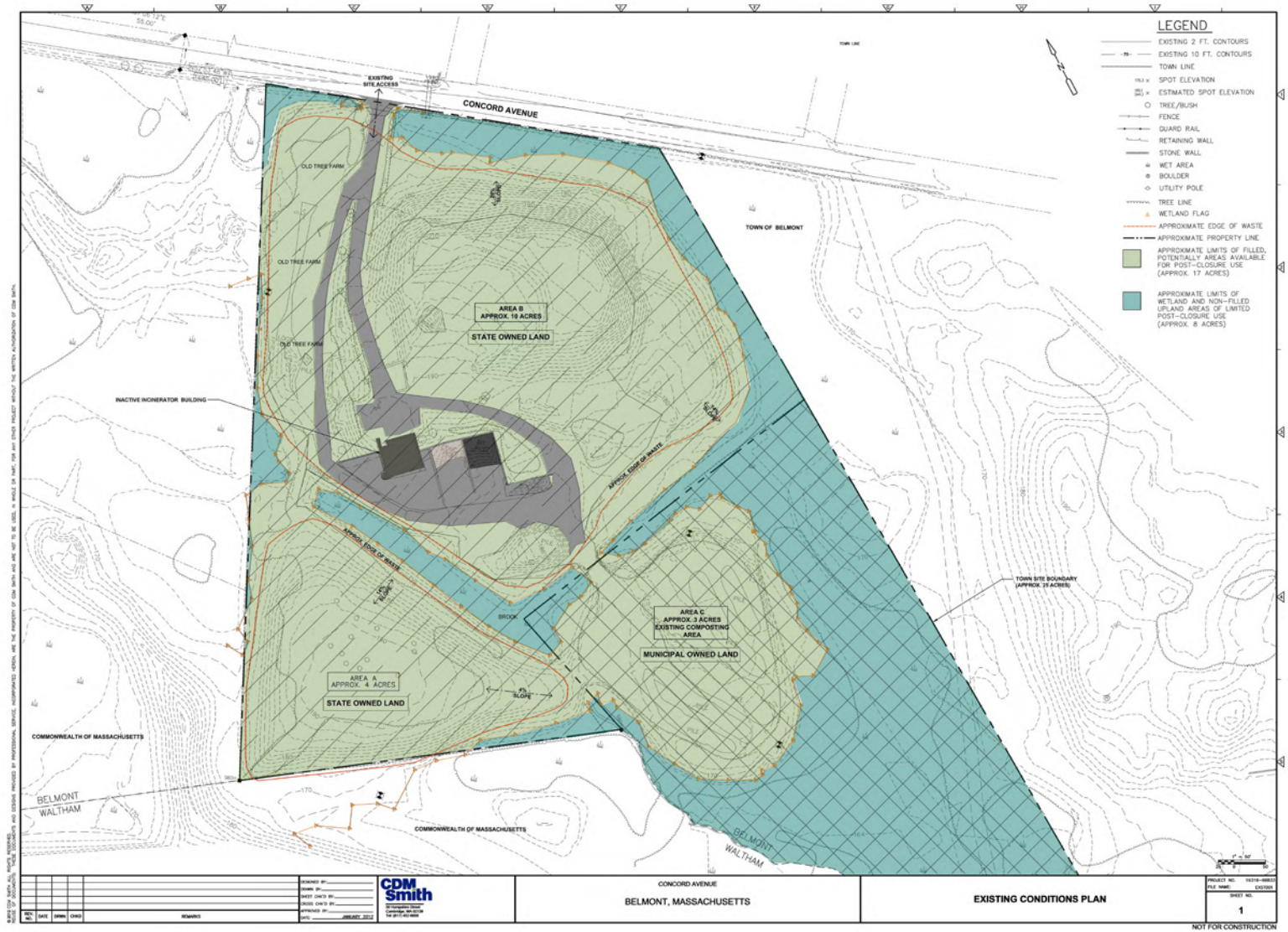
Front Landfill, Brookline – Recreational Field

Landfill Site Overview

Inactive Incinerator/Transfer Station building to be demolished

- Comprised of two parcels
  - Total Site is 25.5 acres
  - Approximately 17 acres historically landfilled – upland
  - Remaining 8.5 acres wetland resource areas
- Demolition of inactive incinerator/transfer station building

Conceptual Site Plan and Landfilled Areas

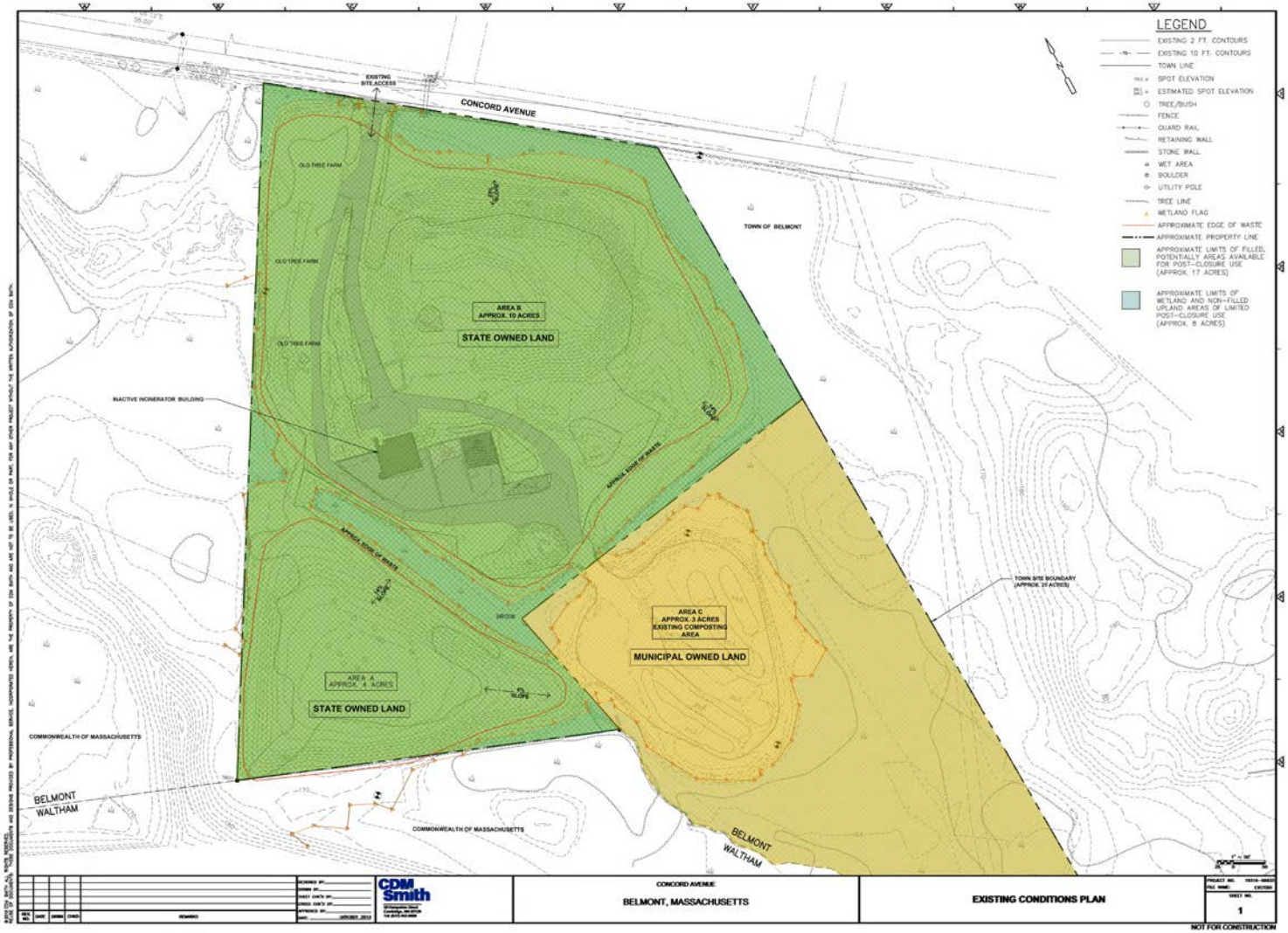


Project Requirements, continued

Existing Town Public Works Materials Storage On-Site

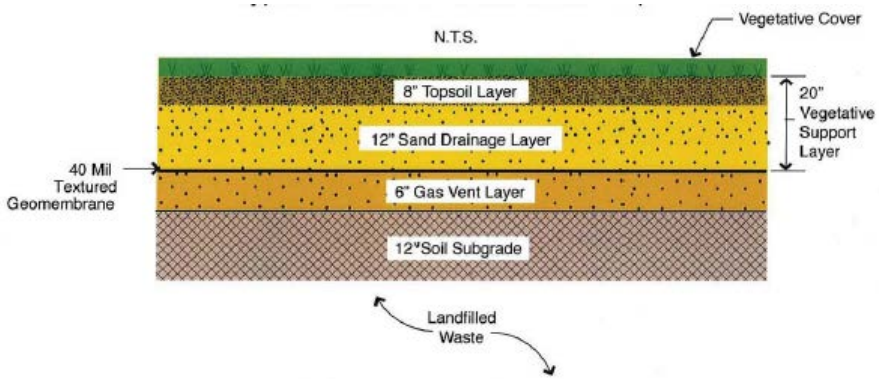
- Property conveyance legislation of front parcel
  - Future limitation to Town uses
- Allowed for continuing current Town public works site uses

Current Property Ownership



Project Regulatory Requirements

- MassDEP Solid Waste Management Regulations
  - Required to cap landfilled areas
  - Post-closure uses have to be approved by MassDEP – implement concurrent with capping
- Wetlands Protection Act
  - Conservation Commission approval
  - Future use limited to open space and buffers



Wetland between landfill areas

Relevant Considerations for Post-Closure Use of Landfill Site

- Protective of human health, safety and the environment
- Able to integrate with final cap and allow its continued function and maintenance
- Public acceptance
- Accommodate settlement and subsidence of underlying landfilled ash
- Side slopes decrease usable plateau area
- Municipal use only on parcel that is currently State-owned

Post-Closure Uses Evaluated

Potential Post-Closure Use	Technically Feasible?	Reason to Remove or Continue Evaluate
Passive/Open Space	Yes	Baseline alternative
DPW Material Storage and Related Operations	Yes	Required Use to be incorporated for all future site uses.
Athletic Fields for Town Use	Yes	Adequate space for field(s) and parking
Solar Photovoltaic (PV)	Yes	Potential for revenue generation
Ice Rink	No	Settling of landfilled ash problematic for ice rink
Relocate Police Station	Yes	Adequate space to accommodate police station
Relocate Town Public Works Garage	No	Inadequate space for all public works functions even with extensive walls
School	No	Difficult MassDEP approval and public acceptance issues

Post-Closure Uses Selected for Further Consideration

Potential Post-Closure Use	Description of Conceptual Plan
Passive/Open Space	Baseline alternative – landfill capped with no active use except DPW
Required DPW Material Storage and Operations	Included to greatest extent possible in all site uses evaluated
Athletic Fields for Town Use	Evaluated different field configurations and types with associated parking
Solar Photovoltaic (PV)	Preliminary layout of solar panels
Relocate Police Station	Relocated police station with required parking

Town Public Works Required Uses

Public works material storage bin at closed Brookline Landfill

- Leaf and yard waste drop-off and storage (including logs and brush)
- Bin storage
  - General construction materials
  - Excess soils from projects
  - Appliances for recycling
  - Asphalt and concrete
  - Street sweepings
  - Catch basin cleanings
- Snow storage
- Contractor staging area(s)

Recreation – Large Rectangular Field

Recreation – Two Independent Ballfields

Recreation – Multi-Purpose Athletic Fields

Recreational Fields Considerations

Advantages

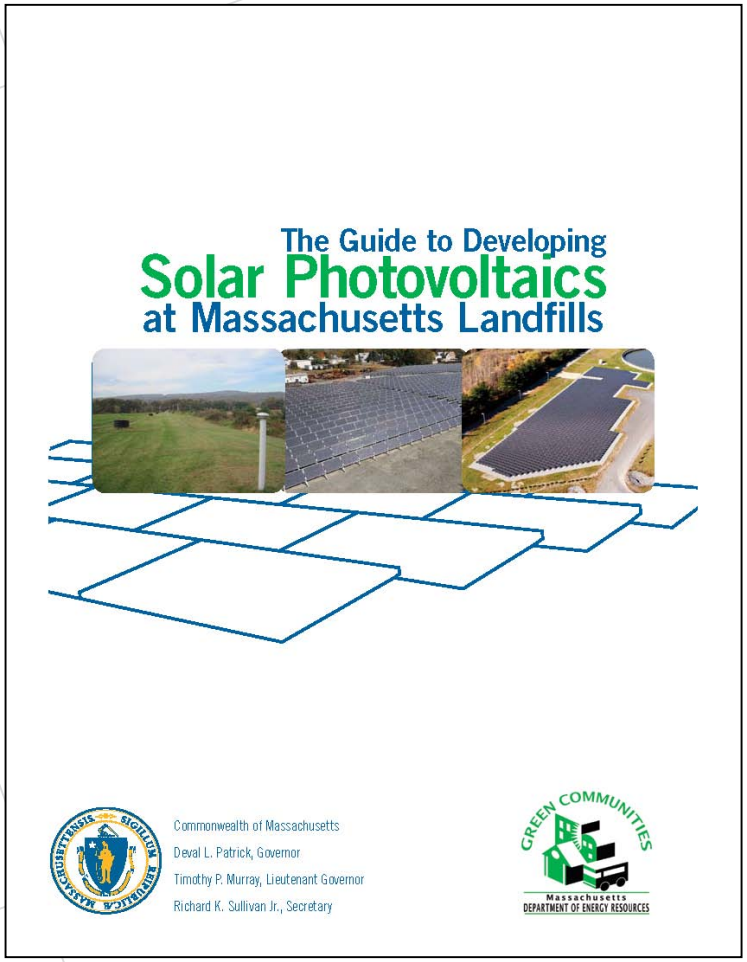
- Landfills are compatible with the development of recreational fields
- Provides needed field space for Town
- Compatible with abutting land uses

Disadvantages

- Incremental additional cost for field construction over cap compared to non-landfill site
- Requires design to separate field from Town public works operations
- Field(s) not centrally located in Town

Solar Photovoltaic Installation – Area B

Summary of Solar PV Use



- Lease of land for 20+ years
- Preliminary estimate – 1MW rated output
- Estimated revenue from lease– approximately $20,000 per year

Solar PV Installation Considerations

Advantages

- Capped landfills are compatible with the development of solar PV systems
- Compatible with abutting land uses
- Additional environmental benefits – GHG reduction

Disadvantages

- Ties property up for lease of at least 20-years
- Minimal revenue to Town
- Power generated more expensive than other green options
- More expensive installation and maintenance on landfill than other sites

Re-Located Police Station Use

Relocated Police Station Considerations

Advantages

- Site has more than adequate room for police station, parking, etc..
- Opens up potential other use of current police station site
- Because of available space, can be made compatible with Town public works uses

Disadvantages

- Building foundations over landfilled ash will add cost
- Police station not centrally located in Town

Additional Traffic Associated with Evaluated Site Uses

Potential Post-Closure Use	Daily Range of Traffic to Use
DPW Material Storage Operations	No change over current traffic levels
Recreational Fields	Increased traffic when fields in use, particularly on weekend days in fall and spring.
Solar PV System	Minimal additional trips for maintenance, site inspections, etc.
Relocated Police Station	Increased traffic trips to site for officers, staff and public

Next Steps

- Continue process of soliciting public comment on potential site uses and preferred options
  - Provide draft final report on alternatives to public
  - Select preferred site use
- Finalize acquisition by Town of front parcel from State
  - Town funding updated survey and appraisal
- Develop schedule for completion of MassDEP requirements and concurrent development of proposed long-term site use
- Prepare MassDEP required closure and post-closure use permit applications

Questions and Comments

Large Rectangular Building Concept

Public Works Garage Conceptual Layout

CDM Smith

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