University of Massachusetts Chan Medical School

Stormwater Management Program

For Coverage Under The

National Pollutant Discharge Elimination System (NPDES)
General Permit for Municipal Separate Storm Sewer Systems (MS4)

University of Massachusetts Chan Medical School
55 Lake Ave North, Worcester, MA 01655

EPA NPDES Permit Number MAR042049

June 30, 2022
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Certification

Authorized Representative: University of Massachusetts Chan Medical School has designated David Flanagan, Deputy Executive Vice Chancellor for Facilities, as an authorized representative to sign MS4 reports. David Flanagan is designated as an authorized person for signing all reports including but not limited to the stormwater management plan, stormwater pollution prevention plans, inspection reports, annual reports, monitoring reports, reports on training, and other information required by the MS4 Permit. The authorization letter is provided in Appendix A.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

David Flanagan, Deputy Executive Vice Chancellor for Facilities Management

Signature: ______________________ Date: 7/26/24

Background

The University of Massachusetts Chan Medical School (UMass Chan Medical School) is committed to sustainability throughout our operations, as well as by encouraging sustainable practices among students, faculty and staff. This commitment extends to protecting water resources through education, stewardship, and facility operations that prevent stormwater pollution. UMass Chan Medical School's Stormwater Management Program (SWMP) outlines UMass Chan Medical School's existing and planned measures to protect water resources and to comply with the National Pollutant Discharge Elimination System (NPDES) Phase II General Permit for Municipal Separate Storm Sewer Systems (MS4s).

Regulatory Context

Under the Clean Water Act, the Stormwater Phase II Final Rule was promulgated in 1999 and was the next step after the 1987 Phase I Rule in the Environmental Protection Agency's (EPA's) effort to preserve, protect, and improve the Nation's water resources from polluted stormwater runoff. The Phase II program expanded the Phase I program by requiring additional operators of MS4s in urbanized areas and operators of small construction sites, through the use of NPDES permits, to implement programs and practices to control polluted stormwater runoff. Under the Phase II rule, all MS4s with stormwater discharges from Census designated Urbanized Area are required to seek NPDES permit coverage for those stormwater discharges.

On May 1, 2003, EPA Region 1 issued its Final General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (2003 MS4 Permit) consistent with the Phase II rule. The 2003 small MS4 permit covered "traditional" (i.e., cities and towns) and "non-traditional" (i.e., Federal and state agencies) MS4 Operators located in the states of Massachusetts and New Hampshire. This permit expired on May 1, 2008 but remained in effect until operators were authorized under the 2016 MS4 Permit, which became effective on July 1, 2018. On May 16, 2022, EPA decided to administratively continue the coverage of the 2016 MS4 Permit to extend past its expiration date of June 30, 2022 until a new MS4 permit is issued.

UMass Chan Medical School is categorized as a non-traditional MS4 and a new permittee, since it was not covered under the 2003 MS4 Permit.

University of Massachusetts Chan Medical School MS4 Facilities

UMass Chan Medical School operates at four campuses located within the MS4 regulated area. This SWMP previously included facilities located at 333 South Street (Shrewsbury), 222 Maple Avenue (Shrewsbury) and 460 Walk Hill Street, Mattapan (MassBiologics) and their associated receiving waterbodies. After further review of facility ownership, these facilities were determined to be owned by Worcester City Campus Corporation and not UMass Chan Medical School. Therefore, these facilities are not part of UMass Chan Medical School's jurisdiction and were removed from this SWMP in June 2022.

Main Campus, Worcester
The UMass Chan Medical School main campus is located on more than 60 acres in Worcester,

Massachusetts, just north of Route 9 on the west side of Lake Quinsigamond, between Plantation Street and North Lake Avenue. The physical address of the main campus is 55 North Lake Avenue. The main campus includes the University of Massachusetts Chan Medical School and the UMass Memorial Medical Center University Campus and buildings that are either owned or leased, with spaces for academics, research, laboratories, offices, patient care, and ancillary support.

Stormwater Management Program (SWMP)

The SWMP describes the activities and measures, or Best Management Practices (BMPs), that UMass Chan Medical School will implement to meet the terms and conditions of the permit. The SWMP has been prepared to comply with the overall general permit, modified requirements for Non-Traditional MS4s, and timeline extensions for New Permittees. The SWMP is intended to be a "living document", which UMass Chan Medical School will update and/or modify during the permit term as new information is developed or UMass Chan Medical School's activities are modified, changed, or updated to meet permit conditions. UMass Chan Medical School will assess the need for SWMP updates as part of the Annual Evaluation to be completed, along with the Annual Report, by the end of September each year. Permit years referenced in the SWMP correspond to fiscal years, beginning with fiscal year 2019 (permit year 1).

The main elements of the SWMP are organized by minimum control measures (MCMs) and additional BMPs for discharges to water quality limited waterbodies.

MCM 1: A public education program aiming to affect public behavior causing stormwater pollution,

MCM 2: An opportunity for the public to participate and provide comments on the stormwater program,

MCM 3: A program to effectively find and eliminate illicit discharges within the MS4,

MCM 4: A program to effectively control construction site stormwater discharges to the MS4,

MCM 5: A program to ensure that stormwater from development projects entering the MS4 is adequately controlled by the construction of stormwater controls,

MCM 6: A good housekeeping program to ensure that stormwater pollution sources on municipal properties and from municipal operations are minimized, and

TMDLs and Water Quality Impairments: Enhanced and additional BMPs to reduce pollutants of concern discharging to waterbodies with water quality impairments and Total Maximum Daily Loads (TMDLs) related to urban stormwater runoff.

Small MS4 Authorization

UMass Chan Medical School submitted its Notice of Intent (NOI) on September 24, 2019. EPA granted Authorization to Discharge on February 14, 2019. The NOI and Authorization Letter can be found at the following links:

- NOI: https://www3.epa.gov/region1/npdes/stormwater/ma/ntms4noi/umass-medical-school.pdf
- Authorization Letter: https://www3.epa.gov/region1/npdes/stormwater/ma/ntms4noi/umass-medical-school-auth.pdf

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Stormwater Management Program Team

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Receiving Waters

The following table lists UMass Chan Medical School's receiving waters, impairments, and the number of outfalls discharging to each waterbody segment.

Waterbody segment that receives flow from the MS4	**Number of outfalls into receiving water segment**	**Chloride**	**Chlorophyll-a**	**Dissolved Oxygen/ DO Saturation**	**Nitrogen**	**Oil & Grease/PAH**	**Phosphorus**	**Solids/TSS/Turbidity**	**E. Coli**	**Enterococcus**	**Other pollutant(s) causing impairments**
Lake Quinsigamond (MA51125)	0 (1 out-going interconnection)			X						X	Curly-leaf Pondweed*, Eurasian Water Milfoil / Myriophyllum Spicatum*, Fanwort*, Non-Native Aquatic Plants*, Water Chestnut*, Algae

*TMDL not required (non-pollutant)

Eligibility: Endangered Species and Historic Properties

Endangered Species Act (ESA) eligibility determination

UMass Chan Medical School has completed the ESA eligibility process outlined in MS4 Permit Appendix C. According to the U.S. Fish & Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) tool, UMass Chan Medical School campuses potentially contain habitat for Northern Long-eared Bat, which is listed as a threatened species.

UMass Chan Medical School has determined that the stormwater discharges and discharge related activities will have no effect on any federally threatened or endangered listed species or designated critical habitat under the jurisdiction of the USFWS. If, during the course of the permit term, UMass Chan Medical School plans to install a structural BMP not identified in the NOI, UMass Chan Medical School will conduct an endangered species screening for the proposed site and will contact the USFWS if UMass Chan Medical School determines that the new activity "may affect" or is "not likely to adversely affect" listed species or critical habitat under the jurisdiction of the USFWS.

In accordance with the ESA eligibility process outlined in MS4 Permit Appendix C, UMass Chan Medical School certifies permit eligibility with the ESA under **Criterion C.**

<u>USFWS Criterion C</u>: *Using the best scientific and commercial data available, the effect of the stormwater discharge and discharge related activities on listed species and critical habitat have been evaluated. Based on those evaluations, a determination is made by EPA, or by the applicant and affirmed by EPA, that the stormwater discharges and discharge related activities will have "no effect" on any federally threatened or endangered listed species or designated critical habitat under the jurisdiction of the USFWS.*

The following attachments are included in Appendix B:

- Lake Avenue North, Worcester campus IPaC resource list

National Historic Preservation Act (NHPA) eligibility determination

UMass Chan Medical School has completed the NHPA eligibility process outlined in MS4 Permit Appendix D. UMass Chan Medical School campuses do not have property listed or eligible for listing on the National Register of Historic Places. No prior surveys or disturbances have revealed the existence of historic properties or artifacts. Operation of UMass Chan Medical School MS4 does not have the potential to cause effects on historic properties.

In accordance with the NHPA eligibility process outlined in MS Permit Appendix D, UMass Chan Medical School certifies permit eligibility with the NHPA under **Criterion B.**

<u>NHPA Criterion B</u>: *A survey was conducted. The survey concluded that no historic properties are present. Discharges do not have the potential to cause effects on historic properties.*

MCM 1 Public Education and Outreach

Permit Part 2.3.2

Objective

The objective of UMass Chan Medical School's public education and outreach program is to increase awareness and influence behavior of the public so that stormwater pollutants are reduced.

Program Overview

UMass Chan Medical School's program is structured in accordance with the MS4 Permit at Part 2.3.2 and with specific requirements for impaired waterbodies in Appendix H and Appendix F of the MS4 Permit. As a non-traditional MS4, UMass Chan Medical School's target audiences differ slightly from those targeted by traditional (municipal) MS4s. UMass Chan Medical School's target audiences include the people who are most likely to affect pollution on UMass Chan Medical School properties, and those who are most likely to be reached through interaction with UMass Chan Medical School: visitors, students, staff, and contractors. The messages focus on stormwater pollutants that are most likely to be generated by the public on UMass Chan Medical School properties and to impact UMass Chan Medical School's receiving waterbodies:

- Trash,
- Sediment,
- Fertilizer,
- Leaf litter, and
- Grass clippings.

The educational messages will be distributed through a range of forums, selected to best reach each target audience. Each public education BMP has a measurable goal, which UMass Chan Medical School will assess annually to ensure that educational messages are reaching target audiences effectively.

The following table summarizes the educational messages, target audiences, and distribution schedule.

BMP	Target Audience	Schedule by Permit Year (Fiscal Year)						
		1 (FY19)	2 (FY20)	3 (FY21)	4 (FY22)	5 (FY23)	6 (FY24)	7 (FY25)
1-1: Think Blue Advertising Campaign	Visitors, Students, Staff	x						
1-2: Web Page	Visitors, Students, Staff	x	x	x	x	x	x	x
1-3: Growing Green Newsletter	Visitors, Students, Staff	x	x	x	x	x	x	x
1-4: Stormwater Fact Sheet	Visitors, Students, Staff			x	x	x	x	x
1-5: Contractor Education	Contractors			x	x	x	x	x
1-6: Facility Staff Education	Facility Staff				x	x	x	x

BMP 1-1: Think Blue Advertising Campaign

Description:

Think Blue Massachusetts (https://www.thinkbluemassachusetts.org/) ran an advertising campaign on behalf of MS4 communities from May 31 to June 25th, 2018. The “Fowl Water” advertisement, targeting MA urban residents, aimed to help viewers visualize stormwater pollution from motor oil, pet waste, and trash. Even though UMass Chan Medical School is not part of a municipal coalition, UMass Chan Medical School staff and visitors reside within those communities. Relevant to UMass Chan Medical School , Think Blue targeted outreach to the Charles River region (TOC-TBM-Charles-River-Regional-Campaign-Report-06252018) and the Central Massachusetts region (TOC-TBM-Central-Massachusetts-Campaign-Report-06252018). UMass Chan Medical School will amplify the “Fowl Water” message by adding links to UMass Chan Medical School’s stormwater webpage (BMP 1-2).

Targeted Audience:

- Visitors, students, and staff

Responsible Department/Parties:

- Environmental Health & Safety, Sustainability

Measurable Goal(s):

- Views in Charles River and Central MA Regions

BMP 1-2: Web Page

Description:

UMass Chan Medical School will create and maintain a stormwater management page on the Growing Green website. The webpage will include stormwater pollution prevention tips, links to ThinkBlue Massachusetts videos and educational materials, and information about UMass Chan Medical School’s stormwater management program.

Targeted Audience:

- Visitors, students, and staff

Responsible Department/Parties:

- Environmental Health & Safety, Sustainability

Measurable Goal(s):

- Website views

BMP 1-3: Growing Green Newsletter

Description:

UMass Chan Medical School will post on UMass Chan Medical School’s Growing Green newsletter about stormwater pollution prevention and will provide a link to UMass Chan Medical School’s

Growing Green stormwater webpage. This post will be repeated annually, potentially with slight variations in the content. The educational message will focus on general stormwater awareness and pollution prevention (such as ThinkBlue's stormwater 101 materials).

Targeted Audience:

- Visitors, students, and staff

Responsible Department/Parties:

- Environmental Health & Safety, Sustainability

Measurable Goal(s):

- Followers, likes, shares, and comments

BMP 1-4: Stormwater Fact Sheet

Description:

UMass Chan Medical School will set up a table with stormwater education materials, including a stormwater fact sheet, and other educational media (such as the Think Blue video) at its annual Earth Day event.

Targeted Audience:

- Visitors, students, and staff

Responsible Department/Parties:

- Environmental Health & Safety

Measurable Goal(s):

- Number of people engaged at Earth Day event

BMP 1-5: Contractor Education

Description:

UMass Chan Medical School will provide stormwater awareness and pollution prevention fact sheets to contractors with each purchase order to educate them on stormwater management.

Targeted Audience:

- Contractors

Responsible Department/Parties:

- Facilities Engineering, Facilities Maintenance, and Environmental Health and Safety

Measurable Goal(s):

- Number of Contractors reached

BMP 1-6: Facility Staff Education

Description:

UMass Chan Medical School will provide annual training to facility staff on UMass Chan Medical School's O&M Plan. O&M procedures will include measures such as landscape maintenance to reduce phosphorus loading.

Targeted Audience:

- Facility staff

Responsible Department/Parties:

- Facilities Engineering, Facilities Maintenance, and Environmental Health and Safety

Measurable Goal(s):

- Number of facility staff reached

MCM 2 Public Involvement and Participation

Permit Part 2.3.3

Objective

UMass Chan Medical School's objective for its Public Involvement and Participation program is to engage the public in review and implementation of the SWMP.

Program Overview

The following table summarizes the public involvement and participation BMPs and schedule.

BMP	Schedule by Permit Year (Fiscal Year)						
	1 (FY19)	2 (FY20)	3 (FY21)	4 (FY22)	5 (FY23)	6 (FY24)	7 (FY25)
2-1: Public Review of SWMP	x	x	x	x	x	x	x
2-2: Earth Day Event	x	x	x	x	x	x	x
2-3: E-Waste Recycling Events	x	x	x	x	x	x	x

BMP 2-1: Public Review of Stormwater Management Program (SWMP)

Description:

UMass Chan Medical School will post its SWMP online on its Growing Green-Stormwater Management webpage (BMP 1-2) to allow for ongoing public review of its SWMP. The webpage will provide an email address (stormwater@umassmed.edu) for the public to provide comments, ask questions, or report stormwater issues. UMass Chan Medical School will annually share the stormwater management website link in the Growing Green newsletter so the public can easily navigate to the page and review the SWMP. The SWMP will be located at: https://www.umassmed.edu/growinggreen/stormwater-management/.

Responsible Department/Parties:

- Environmental Health & Safety, Sustainability

Measurable Goal(s):

- Post stormwater management plan on website
- Track comments received and resolutions

BMP 2-2: Earth Day Event

Description:

UMass Chan Medical School hosts an annual Earth Day Event at its main campus in Worcester. At the Earth Day event, UMass Chan Medical School will display information about stormwater management and hand out brochures. Specific focus topics will vary by year and may include volunteer opportunities for pollution prevention. More information is available at https://www.umassmed.edu/growinggreen/earthday/.

Responsible Department/Parties:

- Environmental Health & Safety, Sustainability

Measurable Goal(s):

- Event and volunteer opportunities sponsored/supported annually

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BMP 2-3: E-Waste Recycling Events

Description:

UMass Chan Medical School will host E-waste recycling events on each campus for members of the UMass Chan Medical School community to dispose of electronic waste for recycling purposes.

Responsible Department/Parties:

- Environmental Health & Safety, Sustainability

Measurable Goal(s):

- Number of events hosted annually

MCM 3 Illicit Discharge Detection and Elimination (IDDE) Program

Permit Part 2.3.4

Objective

UMass Chan Medical School's objective for the IDDE program is to systematically find and eliminate illicit sources of non-stormwater discharges to its MS4 and to prevent such discharges.

Program Overview

The following table summarizes the IDDE BMPs and schedule.

BMP	Schedule by Permit Year (Fiscal Year)						
	1 (FY19)	2 (FY20)	3 (FY21)	4 (FY22)	5 (FY23)	6 (FY24)	7 (FY25)
3-1: Sanitary Sewer Overflow (SSO) Inventory				Initial Inventory	x	x	x
3-2: Storm Sewer System Mapping	x	x	x	x	Complete Phase 1 Map	x	x
3-3: Written IDDE Program				x	x	x	x
3-4: Employee Training	x	x	x	x	x	x	x
3-5: Dry Weather Screening					x		
3-6: Catchment Investigations (beyond permit term)							x
3-7: Wet Weather Screening (beyond permit term)							x
3-8: Ongoing Screening (beyond permit term)							

BMP 3-1: Sanitary Sewer Overflow (SSO) Inventory

Description:

UMass Chan Medical School will develop an inventory of sanitary sewer overflows (SSOs) that have occurred on UMass Chan Medical School campuses over the past 5 years and will update that list annually. An SSO is a discharge of untreated sanitary wastewater from a municipal sanitary sewer. While UMass Chan Medical School does not own sanitary sewer lines and is therefore not directly responsible for SSOs, UMass Chan Medical School will identify and report locations and maintain an inventory of SSOs that have occurred on UMass Chan Medical School properties, in coordination with those entities responsible for the sanitary sewer systems.

An overflow or bypass must be reported within 24 hours by phone to MassDEP, EPA, and other relevant parties. Follow up the verbal notification with a written report following MassDEP's Sanitary Sewer Overflow (SSO)/Bypass notification form within 5 calendar days of the time you become aware of the overflow, bypass, or backup.

DEP 24-hour Emergency Line: 1-888-304-1133		
DEP Northeast Region (978) 694-3215 205B Lowell Street Wilmington, MA 01887	DEP Central Region (508) 792-7650 8 New Bond Street Worcester, MA 01606	EPA New England (617) 918-1510 5 Post Office Square Boston, MA 02109

Responsible Department/Parties:

- ➢ Environmental Health & Safety, Facility Engineering & Construction, Facilities Maintenance Services

Measurable Goal(s):

- ➢ Complete within 4 years of permit effective date (by June 30, 2022) and update annually thereafter

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BMP 3-2: Map of Storm Sewer System

Description:

UMass Chan Medical School will incrementally build a GIS map of its stormwater system, beginning in Permit Year 1. The Phase I map, scheduled to be completed by June 30, 2023, will include:

- Outfalls
- Open channel conveyances (swales, ditches, etc.)
- Interconnections with other MS4s and other storm sewer systems
- UMass Chan Medical School-owned stormwater treatment structures (e.g., detention and retention basins, infiltration systems, bioretention areas, water quality swales, particle separators, oil/water separators, or other proprietary systems)
- Waterbodies identified by name and indication of all use impairments as identified on the most recent EPA approved Massachusetts Integrated List of Waters report
- Initial catchment delineations. A catchment is the area that drains to an individual outfall or interconnection.

The Phase II map, scheduled to be completed by June 30, 2031, will include:

- Outfall spatial location (latitude and longitude with a minimum accuracy of +/-30 feet)
- Pipes
- Manholes
- Catch basins
- Refined catchment delineations. Catchment delineations will be updated to reflect information collected during catchment investigations.
- Municipal sanitary sewer system (if available)
- Municipal combined sewer system (if applicable).

Responsible Department/Parties:

- Environmental Health & Safety, Facility Engineering & Construction, Facilities Maintenance Services

Measurable Goal(s):

- Complete Phase 1 map within 5 years of permit effective date (by June 30, 2023) and complete full system map 13 years after permit effective date (by June 30, 2031)

BMP 3-3: Written IDDE Program

Description:

UMass Chan Medical School will develop a written IDDE program, which will include:

- Illicit discharge policy
- Roles and responsibilities
- SSO inventory
- Assessment and priority ranking of outfalls/interconnections
- Dry weather outfall screening and sampling procedures
- Catchment investigation procedures
- Wet weather sampling procedures
- Training
- Reporting

UMass Chan Medical School will complete initial outfall assessment and ranking in Permit Year 4 (FY2023), using available data. As new data become available through GIS mapping, outfall inspections, and catchment investigations, UMass Chan Medical School will annually update the outfall ranking. Outfalls will be categorized as Problem, High Priority, Low Priority, or Excluded, as defined in the MS4 Permit at Part 2.3.4.7. Outfalls discharging to waterbodies impaired for or with a TMDL for bacteria or pathogens will be categorized as Problem or High Priority.

UMass Chan Medical School will update the IDDE Program annually and will post the Program online on its stormwater management webpage.

Responsible Department/Parties:

- Facility Engineering & Construction, Facilities On-Site Maintenance Services, EH&S Safety Officer

Measurable Goal(s):

- Complete the written IDDE Program within 4 years of permit effective date (by June 30, 2022) and update as required

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BMP 3-4: Employee Training

Description:

UMass Chan Medical School will add IDDE Program training, including how to recognize and respond to illicit discharges and SSOs, to its annual Spill Prevention, Control, and Countermeasure (SPCC) training. Environmental Health & Safety, Facility Engineering & Construction, Facilities On-Site Maintenance Services, and EH&S Safety Officer employees complete a SPCC training on the anniversary of their hire date.

Responsible Department/Parties:

- Environmental Health & Safety, Facility Engineering & Construction, Facilities On-Site Maintenance Services, EH&S Safety Officer

Measurable Goal(s):

- Train annually

BMP 3-5: Dry Weather Screening

Description:

UMass Chan Medical School will conduct in dry weather screening in accordance with outfall screening procedures and permit conditions to identify illicit contributions to the system. Procedures for and findings from dry weather outfall screening will be documented in the written IDDE Program (BMP 3-3). UMass Chan Medical School will complete dry weather screening of all outfalls by June 30, 2024.

Responsible Department/Parties:

- Facility Engineering & Construction, Facilities On-Site Maintenance Services, EH&S Safety Officer

Measurable Goal(s):

- Complete within 6 years of permit effective date (by June 30, 2024)

BMP 3-6: Catchment Investigations

Description:

UMass Chan Medical School will implement catchment investigations according to program and permit conditions. Procedures for and findings from catchment investigations will be documented in the written IDDE Program (BMP 3-3). UMass Chan Medical School will complete catchment investigations by June 30, 2031.

Responsible Department/Parties:

- Facilities On-Site Maintenance Services, EH&S Safety Officer

Measurable Goal(s):

- Complete within 13 years of permit effective date (by June 30, 2031)

BMP 3-7: Wet Weather Screening

Description:

UMass Chan Medical School will conduct wet weather screening in accordance with outfall screening procedure to identify illicit discharges to its MS4. Procedures for and findings from wet weather screening will be documented in the written IDDE Program (BMP 3.3). UMass Chan Medical School will complete wet weather screening by June 30, 2031.

Responsible Department/Parties:

- Facilities On-Site Maintenance Services, EH&S Safety Officer

Measurable Goal(s):

- Complete within 13 years of permit effective date (by June 30, 2031)

BMP 3-8: Ongoing Screening

Description:

After completion of BMPs 3-5, 3-6, and 3-7, UMass Chan Medical School will continue dry weather and wet weather screening as necessary to identify and eliminate illicit discharges.

Responsible Department/Parties:

- Facilities On-Site Maintenance Services, EH&S Safety Officer

Measurable Goal(s):

- Complete ongoing outfall screening upon completion of IDDE program

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MCM 4 Construction Site Stormwater Runoff Control

Permit Part 2.3.5

Objective

UMass Chan Medical School's objective for its construction stormwater runoff control program is to minimize or eliminate erosion and maintain sediment on site so that it is not transported in stormwater and allowed to discharge to a water of the U.S. through UMass Chan Medical School's MS4.

Program Overview

The following table summarizes Construction Site Stormwater Runoff Control BMPs and schedule.

BMP	Schedule by Permit Year (Fiscal Year)						
	1 (FY19)	2 (FY20)	3 (FY21)	4 (FY22)	5 (FY23)	6 (FY24)	7 (FY25)
4-1: Construction Site Stormwater Runoff Control	x	x	x	x	x	x	x
4-2: Project Design and SWPPP Review	x	x	x	x	x	x	x
4-3: Site Inspection	x	x	x	x	x	x	x

BMP 4-1: Construction Site Stormwater Runoff Control

Description:

As a non-traditional MS4, UMass Chan Medical School does not have the authority to enact an ordinance, bylaw, or other regulatory mechanism regarding construction site stormwater management. The MS4 Permit at Part 5.1.2 stipulates that MS4s without the authority to enact an ordinance should instead have written policies or procedures in place to ensure erosion and sediment control, and control of construction wastes, on projects that disturb one or more acres of land.

UMass Chan Medical School will ensure construction site stormwater management through compliance with the NPDES Construction General Permit. UMass Chan Medical School includes a bid item and special provisions on construction contracts to be advertised for bid which exceed the one-acre land disturbance threshold. The bid item and special provisions require preparation of a Stormwater Pollution Prevention Plan (SWPPP) in accordance with the Construction General Permit.

UMass Chan Medical School will develop more detailed specifications and will continue to include contract bid items and special provisions for construction site stormwater management for projects that disturb one or more acres of land.

Responsible Department/Parties:

- Facility Engineering & Construction, Facilities On-Site Maintenance Services, EH&S Safety Officer

Measurable Goal(s):

- Continue to include bid item and special provisions in applicable projects

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BMP 4-2: Project Design and SWPPP Review

Description:

UMass Chan Medical School will continue to perform internal reviews of project design work to ensure projects include appropriate erosion and sediment control practices. UMass Chan Medical School will also continue to review construction SWPPPs.

Responsible Department/Parties:

- Facility Engineering & Construction, Facilities On-Site Maintenance Services, EH&S Safety Officer

Measurable Goal(s):

- Number of construction starts with Construction General Permit coverage

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BMP 4-3: Site Inspection

Description:

UMass Chan Medical School will require contractors to perform site inspections in accordance with NPDES Construction General Permit requirements. UMass Chan Medical School's Resident Engineer will also observe erosion and sediment controls on construction projects.

Responsible Department/Parties:

- Facility Engineering & Construction, Facilities On-Site Maintenance Services, EH&S Safety Officer

Measurable Goal(s):

- Number of construction projects that start with SWPPPs

MCM 5 Post-Construction Stormwater Management in New Development and Redevelopment

Permit Part 2.3.6

Objective

UMass Chan Medical School's objective for its post-construction stormwater management program is to reduce the discharge of stormwater pollutants to its MS4 and receiving waterbodies. This is accomplished by retaining or treating stormwater runoff after construction on new or redeveloped sites, and by ensuring proper maintenance of installed stormwater controls.

Program Overview

The following table summarizes Post-Construction Stormwater Management BMPs and schedule.

BMP	Schedule by Permit Year (Fiscal Year)						
	1 (FY19)	2 (FY20)	3 (FY21)	4 (FY22)	5 (FY23)	6 (FY24)	7 (FY25)
5-1: Design Guidelines for New Development and Redevelopment (continued enforcement after implementation)			x				
5-2: As-Built Plans for On-Site Stormwater Control			x	x	x	x	x
5-3: Target Properties for Stormwater Retrofits (beyond permit term)						x	x
5-4: Street Design and Parking Lot Guidelines (beyond permit term)						x	x

BMP 5-1: Design Guidelines for New Development and Redevelopment

Description:

UMass Chan Medical School will adopt design guidelines for post-construction stormwater management to meet permit requirements to ensure any stormwater controls or management practices for new development and redevelopment meet the retention or treatment requirements of the MS4 Permit and all applicable requirements of the Massachusetts Stormwater Handbook.

Responsible Department/Parties:

- Facility Engineering & Construction, Facilities On-Site Maintenance Services, EH&S Safety Officer

Measurable Goal(s):

- Complete within 3 years of permit effective date (by June 30, 2021).

BMP 5-2: As-Built Plans for On-Site Stormwater Control

Description:

UMass Chan Medical School will continue to require contractors to submit as-built plans. Procedures will require submission of as-built drawings no later than two (2) years after completion of applicable UMass Chan Medical School construction projects. The as-built drawings will depict all on-site controls, both structural and non-structural, designed to manage stormwater associated with the completed site.

Responsible Department/Parties:

- Facility Engineering & Construction, Facilities On-Site Maintenance Services, EH&S Safety Officer

Measurable Goal(s):

- Require submission of as-built plans for completed projects.

BMP 5-3: Target Properties for Stormwater Retrofits

Description:

UMass Chan Medical School will identify at least five (5) campus sites that could be modified or retrofitted with stormwater BMPs to reduce the frequency, volume, and pollutant loads of stormwater discharges from its MS4. UMass Chan Medical School will prioritize properties with significant impervious cover that fall within areas discharging to waterbodies with phosphorus impairments. In determining the potential for modifying or retrofitting particular properties, UMass Chan Medical School will consider factors such as maintenance access; subsurface conditions; proximity to water supply, swimming beaches, and shellfish growing areas; and opportunities for public education. UMass Chan Medical School will compile the list of potential retrofits, with five (5) prioritized sites, by the end of Permit Year 6. Beginning with the seventh annual report and in each subsequent annual report, UMass Chan Medical School will identify additional sites that could be retrofitted, to maintain a minimum of five (5) sites in the inventory. UMass Chan Medical School will report on all properties that have been modified or retrofitted with BMPs in each annual report.

Responsible Department/Parties:

- Facility Engineering & Construction, Facilities On-Site Maintenance Services, EH&S Safety Officer

Measurable Goal(s):

- Complete within 6 years of permit effective date (by June 30, 2024) and report annually on retrofitted properties.

BMP 5-4: Street Design and Parking Lot Guidelines

Description:

UMass Chan Medical School will review UMass Chan Medical School street and parking lot design standards and other design guidelines that affect the creation of impervious cover. The assessment will help determine if changes to design standards can be made to support low impact design options, such as permeable paving and minimizing impervious surface. If the assessment indicates that changes can be made, the report will include recommendations and proposed schedules to incorporate policies and standards into relevant documents and procedures to minimize impervious cover attributable to parking areas and street designs. UMass Chan Medical School will implement recommendations, in accordance with the schedules contained in the assessment.

Responsible Department/Parties:

- Facility Engineering & Construction, Facilities On-Site Maintenance Services, EH&S Safety Officer

Measurable Goal(s):

- Complete within 6 years of permit effective date (by June 30, 2024) and implement recommendations of report.

MCM 6 Good Housekeeping and Pollution Prevention for Permittee Owned Operations

Permit Part 2.3.7

Objective

The objective of UMass Chan Medical School's Good Housekeeping program is to prevent or reduce pollutant runoff from Town facilities and operations.

Program Overview

The following table summarizes Good Housekeeping BMPs and schedule.

BMP	Schedule by Permit Year (Fiscal Year)						
	1 (FY19)	2 (FY20)	3 (FY21)	4 (FY22)	5 (FY23)	6 (FY24)	7 (FY25)
6-1: Facilities Inventory				x	x	x	x
6-2: Facility O&M Procedures				x	x	x	x
6-3: Facility SWPPPs				x	x	x	x
6-4: Written MS4 O&M Program				x	x	x	x
6-5: Catch Basin Inspection and Cleaning	x	x	x	x	x	x	x
6-6: Street and Parking Lot Sweeping	x	x	x	x	x	x	x
6-7: Winter Road Maintenance	x	x	x	x	x	x	x
6-8: Stormwater Treatment Facility Inspections	x	x	x	x	x	x	x

BMP 6-1: Facilities Inventory

Description:

UMass Chan Medical School will create an inventory of campus open spaces, buildings and facilities, and vehicles and equipment maintenance and storage areas.

Responsible Department/Parties:

- Facility Engineering & Construction, Facilities On-Site Maintenance Services, EH&S Safety Officer

Measurable Goal(s):

- ➢ Complete within 4 years of permit effective date (by June 30, 2022) and implement annually.

BMP 6-2: Facility Operations and Maintenance (O&M) Procedures

Description:

UMass Chan Medical School will develop written O&M procedures including all requirements contained in 2.3.7.a.ii for open spaces, buildings and facilities, and vehicle and equipment storage and maintenance areas. The O&M Procedures will include pollution prevention practices specific to each category, as listed below. The O&M procedures will include measures such as landscape maintenance to reduce phosphorus loading to impaired waterbodies, as applicable.

1) Open Space:
    - Use, storage, and disposal of pesticides, herbicides, and fertilizers
    - Lawn maintenance and landscaping
    - Trash container placement and cleanings
    - Erosion control and vegetative cover
2) Buildings and facilities where pollutants are exposed to stormwater runoff:
    - Use, storage, and disposal of petroleum products and other potential stormwater pollutants
    - Employee training
    - Spill prevention plans, if applicable
    - Management of dumpsters and other waste management equipment
    - Sweeping and cleaning around facilities
3) Vehicles and equipment
    - Vehicle storage
    - Management of vehicles with fluid leaks
    - Fueling areas
    - Vehicle wash waters

Responsible Department/Parties:
- ➢ Facility Engineering & Construction, Facilities On-Site Maintenance Services, EH&S Safety Officer

Measurable Goal(s):
- ➢ Complete and implement within 4 years of permit effective date (by June 30, 2022).

BMP 6-3: Stormwater Pollution Prevention Plan (SWPPP)

Description:

UMass Chan Medical School will annually evaluate campus facilities to determine whether any facilities have materials and waste storage or handling that may be exposed to stormwater. UMass Chan Medical School currently does not have any facilities that meet the criteria that would require implementation of facility SWPPPs.

UMass Chan Medical School will continue to implement existing Spill Prevention, Control, and Countermeasure (SPCC) plans.

Responsible Department/Parties:

- Facility Engineering & Construction, Facilities On-Site Maintenance Services, EH&S Safety Officer

Measurable Goal(s):

- Annually evaluate applicability of facility SWPPP requirements.

BMP 6-4: MS4 Infrastructure O&M

Description:

UMass Chan Medical School will develop a written a program detailing the activities and procedures UMass Chan Medical School will implement so that the MS4 infrastructure is maintained in a timely manner to reduce the discharge of pollutant from the MS4. The written O&M program will include catch basin cleaning (BMP 6-5), street and parking lot sweeping (BMP 6-6), winter road maintenance (BMP 6-7), and stormwater treatment facility inspection (BMP 6-8).

Responsible Department/Parties:

- Facility Engineering & Construction, Facilities On-Site Maintenance Services, EH&S Safety Officer

Measurable Goal(s):

- Complete within 4 years of permit effective date (by June 30, 2022).

BMP 6-5: Catch Basin Cleaning

Description:

UMass Chan Medical School will establish a catch basin cleaning program, including documenting annual catch basin cleaning and prioritized areas to be cleaned based on the sensitivity of the area and receiving waters.

During Permit Year 2, UMass Chan Medical School will start to track catch basin sediment depth during routine catch basin cleaning. Inspectors will record sediment depth within catch basin sumps as empty, less than half full, half full, and greater than half full. Catch basins found to have sediment depth greater than half full will be prioritized for cleaning during Permit Year 3. Following two years of data collection, UMass Chan Medical School will complete an optimization analysis to schedule routine inspections, cleaning, and maintenance of catch basins such that the following conditions are met:

- Prioritize inspection and maintenance for catch basins located near construction activities. Clean catch basins in such areas more frequently if inspection and maintenance activities indicate excessive sediment or debris loadings.

- Establish a schedule with a goal that the frequency of routine cleaning will ensure that no catch basin at any time will be more than 50 percent full.
- If a catch basin sump is more than 50 percent full during two consecutive routine inspections/cleaning events, document that finding, investigate the contributing drainage area for sources of excessive sediment loading, and to the extent practicable, abate contributing sources. Describe any actions taken in annual report.

UMass Chan Medical School will report in each annual report the total number of catch basins, number inspected, number cleaned, and the total volume or mass of material removed from all catch basins.

Responsible Department/Parties:

- ➢ Facility Engineering & Construction, Facilities On-Site Maintenance Services, EH&S Safety Officer

Measurable Goal(s):

- ➢ Clean catch basins on established schedule and report number of catch basins cleaned and volume of material removed annually.

BMP 6-6: Street and Parking Lot Sweeping

Description:

UMass Chan Medical School will sweep all UMass Chan Medical School roads and parking lots a minimum of twice per year (in the fall and spring). UMass Chan Medical School will also sweep more frequently in areas with land uses that generate higher sediment loading and/or where catch basin inspections indicate higher loading rates.

Responsible Department/Parties:

- ➢ Facilities On-Site Maintenance Services, EH&S Safety Officer

Measurable Goal(s):

- ➢ Report on compliance with street sweeping schedule annually.

BMP 6-7: Winter Road Maintenance

Description:

UMass Chan Medical School will establish and implement written procedures for winter road maintenance, including the use and storage of salt and sand. UMass Chan Medical School will minimize the use of sodium chloride and other salts and will evaluate opportunities for use of alternative materials. UMass Chan Medical School will also ensure that snow disposal activities do not result in disposal of snow into waters of the United States.

Responsible Department/Parties:

- ➢ Facilities On-Site Maintenance Services, EH&S Safety Officer

Measurable Goal(s):

- Report on compliance with winter road maintenance procedures annually.

BMP 6-8: Inspection and Maintenance of Stormwater Treatment Structures

Description:

UMass Chan Medical School will establish and implement inspection and maintenance procedures and frequencies of stormwater treatment structures such as water quality swales, detention basins, infiltration structures, and proprietary treatment devices. UMass Chan Medical School will inspect all UMass Chan Medical School-owned stormwater treatment structures (excluding catch basins) annually at a minimum.

Responsible Department/Parties:

- Facilities On-Site Maintenance Services, EH&S Safety Officer

Measurable Goal(s):

- Report on compliance with inspection and maintenance of treatment structures per established schedule.

TMDLs and Water Quality Limited Waters

The MS4 Permit at Part 2.2 describes additional requirements for MS4s that discharge to waters that are subject to Total Maximum Daily Loads (TMDLs) and/or that discharge to certain water quality limited waters. Specific requirements are detailed in the MS4 Permit Appendix F (for TMDLs) and Appendix H (for impaired waters).

This section identifies UMass Chan Medical School's receiving waterbodies that are impaired or are subject to TMDLs. This section also describes the BMPs that UMass Chan Medical School will implement to meet the MS4 Permit requirements at Part 2.2 and Appendices F and H.

The following table summarizes the additional BMPs that UMass Chan Medical School will implement to meet MS4 Permit Appendix F and Appendix H requirements.

BMP	Schedule by Permit Year (Fiscal Year)						
	1 (FY19)	**2 (FY20)**	**3 (FY21)**	**4 (FY22)**	**5 (FY23)**	**6 (FY24)**	**7 (FY25)**
7-1: Lake Phosphorus Control Plans				x	x	x	x

Bacteria/Pathogens

Applicable Waterbodies

The following receiving waters are water quality limited due to bacteria or pathogens, and/or have an approved TMDL for bacteria/pathogens. Discharges to these waterbodies are subject to the provisions of MS4 Permit Appendix H Part III and Appendix F at Part III.

UMass Chan Medical School Campus	Receiving Waterbody	Segment ID	TMDL Name
Main	Lake Quinsigamond via DCR interconnection	MA51125	N/A

Enhanced BMPs

The following table summarizes the Enhanced BMPs, as described under the MCMs above, that UMass Chan Medical School will implement to meet Appendix H and Appendix F requirements for discharge to bacteria/pathogen impaired waterbodies.

Requirements	Enhanced BMPs
Supplement public education program with an annual message encouraging the proper management of pet waste	This requirement is not applicable to UMass Chan Medical School, as dog walking is not allowed on UMass Chan Medical School campuses
Disseminate educational materials to dog owners at the time of issuance or renewal of a dog license, or other appropriate time	This requirement is not applicable to UMass Chan Medical School, as it does not have the authority to issue dog licenses
Provide information to owners of septic systems about proper maintenance in any catchment that discharges to a water body impaired for bacteria or pathogens	This requirement is not applicable to UMass Chan Medical School, as it does not own or operate septic systems
Designate catchments draining to any waterbody impaired for bacteria/pathogens as either Problem Catchments or High Priority in implementation of the IDDE Program.	BMP 3-3: Written IDDE Program • Outfalls discharging to waterbodies with a bacteria or pathogen impairment will be categorized as Problem or High Priority.

Nutrients (Phosphorus)

Applicable Waterbodies

The following receiving waters are water quality limited due to phosphorus. Discharges to these waterbodies are subject to the provisions of MS4 Permit Appendix H Part III and Appendix F at Part III.

UMass Chan Medical School Campus	Receiving Waterbody	Segment ID	TMDL Name
Main	Lake Quinsigamond	MA51125	Total Maximum Daily Load of Phosphorus for Lake Quinsigamond and Flint Pond

Enhanced BMPs – Nutrients (Phosphorus)

The following table summarizes the Enhanced BMPs, as described in the SWMP above, that UMass Chan Medical School will implement to meet MS4 Permit Appendix H requirements for discharge to phosphorus-impaired waterbodies and their tributaries.

Requirements	Enhanced BMPs
Distribute an annual message in the spring (April/May) that encourages the proper use and disposal of grass clippings and encourages the proper use of slow-release and phosphorus-free fertilizers	BMP 1-6: Annual facility staff training will include the topics of proper disposal of grass clippings and proper use of fertilizers.
Distribute an annual message in the summer (June/July) encouraging the proper management of pet waste	This requirement is not applicable to UMass Chan Medical School, as dog walking is not allowed on UMass Chan Medical School campuses.
Distribute an annual message in the fall (August/September/October) encouraging the proper disposal of leaf litter	BMP 1-6: Annual facility staff training will include the topics of proper disposal of leaf litter.
For post-development stormwater management, include a requirement that new development and redevelopment stormwater management BMPs be optimized for phosphorus removal	BMP 5-1: Design Guidelines for New Development and Redevelopment specify BMP designs must be optimized for phosphorus removal.
For retrofit inventory and priority ranking, include consideration of BMPs to reduce nutrient discharges	BMP 5-3: Target Properties for Stormwater Retrofits. UMass Chan Medical School will evaluate all properties identified as presenting retrofit opportunities or areas for structural BMP installation, identified in the Nutrient Source Identification Reports (BMP 6-9), that are within the drainage area of Lake Quinsigamond or its tributaries or tributaries to Blackstone River.

Requirements	Enhanced BMPs
Establish procedures to properly manage grass cuttings and leaf litter on permittee property, including prohibiting blowing organic waste materials onto adjacent impervious surfaces	BMP 6-2: Facility Operations and Maintenance (O&M) Procedures will cover this topic.
Increase street sweeping frequency of all municipal owned streets and parking lots subject to permit part 2.3.7.a.iii.(c) to a minimum of two times per year (spring and fall)	BMP 6-6: Street and Parking Lot Sweeping. UMass Chan Medical School will sweep all streets and parking lots two times per year (spring and fall).

Lake and Pond Phosphorus TMDLs

Between 1999 and 2010 EPA has approved 13 Lake TMDLs completed by MassDEP covering 78 lakes and ponds within the Commonwealth of Massachusetts[1]. Any permittee that discharges to a waterbody segment covered by the Lake TMDLs is subject to the requirements of MS4 Permit Appendix F at Part A.II. UMass Chan Medical School will meet these requirements as described under BMP 7-1 below.

The following receiving waters fall within watersheds covered by the Lakes and Ponds TMDLs.

UMass Chan Medical School Campus	Receiving Waterbody	Segment ID	TMDL Name
Worcester	Lake Quinsigamond	MA51125	Total Maximum Daily Load of Phosphorus for Lake Quinsigamond and Flint Pond (CN 115.0)

BMP 7-1 Lake Phosphorus Control Plans

Description:

UMass Chan Medical School will develop lake phosphorus control plans (LPCP) for each TMDL listed in the table above. A PCP is a plan to reduce the amount of phosphorus in stormwater discharges from the MS4 to impaired waters and their tributaries covered under those TMDLs. UMass Chan Medical School will complete the plans according to the phases and schedule outlined in the MS4 Permit Appendix F at Part A.II. Key milestones through Permit Year 8 are summarized below. EPA has specified a 2-year timeline extension for new permittees.

Phase 1 of the PCP Component and Milestones	Completion Date
Legal analysis	4 years after permit effective date
Funding source assessment	5 years after permit effective date
Define LPCP scope (LPCP area)	6 years after permit effective date
Calculate baseline phosphorus, allowable phosphorus load, and phosphorus reduction requirement	6 years after permit effective date
Description of planned nonstructural and structural controls	7 years after permit effective date
Description of operation and maintenance program	7 years after permit effective date
Implementation schedule	7 years after permit effective date
Cost and funding source assessment	7 years after permit effective date
Complete written LPCP	7 years after permit effective date
Full implementation of nonstructural controls	7 years after permit effective date

Responsible Department/Parties:

- Facilities Engineering & Construction, Facilities Maintenance Services

[1] Final TMDLs for lakes and ponds can be found at: http://www.mass.gov/eea/agencies/massdep/water/watersheds/total-maximum-daily-loads-tmdls.html

Measurable Goal(s):

- Fully implement plans within 17 years of permit effective date.

Annual Evaluation

This section will be updated annually as annual reports are completed.

Year 1 Annual Report
https://www3.epa.gov/region1/npdes/stormwater/ma/reports/2019/umass-medical-school-ma-ar19.pdf

Year 2 Annual Report
https://www3.epa.gov/region1/npdes/stormwater/ma/reports/2020/umass-medical-school-ma-ar20.pdf

Year 3 Annual Report
https://www3.epa.gov/region1/npdes/stormwater/ma/reports/2021/UMASS_MEDICAL_SCHOOL_MA_AR21.pdf

Year 4 Annual Report
Web address will be posted when available from EPA.

Year 5 Annual Report
Web address will be posted when available from EPA.

Appendix A – Delegation of Authority

July 17, 2024

MEMO TO FILE

Re: Documentation for delegation of "Authorized Representative" for NPDES 2016 Massachusetts Small Municipal Separate Storm Sewer System (MS4) General Permit

This document serves to affirm that David Flanagan has responsibility for the operation of the MS4 and is hereby designated as an authorized person for signing all reports including but not limited to the Stormwater Management Plan (SWMP), Stormwater Pollution Prevention Plans (SWPPPs), inspection reports, annual reports, monitoring reports, reports on training, and other information required by the General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in Massachusetts for University of Massachusetts Medical School. This authorization cannot be used for signing a NPDES permit application (e.g., Notice of Intent (NOI)) in accordance with 40 CFR 122.22).

By signing this authorization, I confirm that I meet the following requirements to make such a designation as set forth in Part B.11 of Appendix B of the Small MS4 General Permit:

> *For a municipality, state, federal, or other public agency: By either a principal executive officer or ranking elected official.*

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

DocuSigned by:

63C9209EE6B442E

7/23/2024

John Lindstedt — Date

Executive Vice Chancellor, Administration and Finance

Appendix B – IPaC Resource Lists

Worcester Main Campus

Includes pages 1 - 3 showing location and endangered species (excludes pages 4 – 9 listing of migratory birds, USFWS facilities, and NWI wetlands)

IPaC Information for Planning and Consultation **U.S. Fish & Wildlife Service**

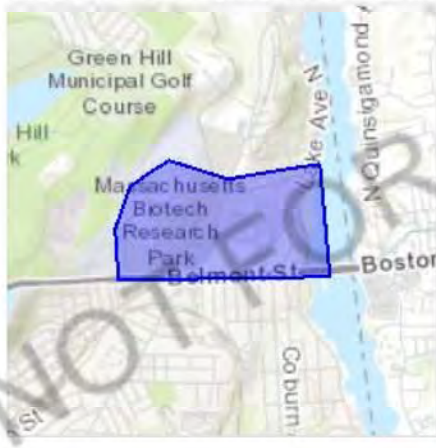
IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Worcester County, Massachusetts



Local office

New England Ecological Services Field Office

(603) 223-2541
(603) 223-0104

70 Commercial Street, Suite 300
Concord, NH 03301-5094

http://www.fws.gov/newengland

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species

[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

---

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act

[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are

Appendix C – IDDE Plan

University of Massachusetts Chan Medical School

Illicit Discharge Detection and Elimination (IDDE) Plan

UMass Chan
MEDICAL SCHOOL

June 30, 2022
Updated April 2024

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1 Introduction

1.1 MS4 Program

This Illicit Discharge Detection and Elimination (IDDE) Plan has been developed by the University of Massachusetts Chan Medical School (UMass Chan Medical School) to address the requirements of the United States Environmental Protection Agency's (USEPA's) 2016 National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in Massachusetts, hereafter referred to as the "2016 Massachusetts MS4 Permit" or "MS4 Permit."

The 2016 Massachusetts MS4 Permit requires that each permittee, or regulated community, address six Minimum Control Measures. These measures include the following:

1. Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination Program
4. Construction Site Stormwater Runoff Control
5. Stormwater Management in New Development and Redevelopment (Post Construction Stormwater Management); and
6. Good Housekeeping and Pollution Prevention for Permittee Owned Operations.

Under Minimum Control Measure 3, the permittee is required to implement an IDDE program to systematically find and eliminate sources of non-stormwater discharges to its municipal separate storm sewer system and implement procedures to prevent such discharges. The IDDE program must also be recorded in a written (hardcopy or electronic) document. This IDDE Plan has been prepared to address this requirement.

1.2 Illicit Discharges

An "illicit discharge" is any discharge to a drainage system that is not composed entirely of stormwater, with the exception of discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the MS4) and discharges resulting from fire-fighting activities.

Illicit discharges may take a variety of forms. Illicit discharges may enter the drainage system through direct or indirect connections. Direct connections may be relatively obvious, such as cross-connections of sewer services to the storm drain system. Indirect illicit discharges may be more difficult to detect or address, such as failing septic systems that discharge untreated sewage to a ditch within the MS4, or a sump pump that discharges contaminated water on an intermittent basis.

Some illicit discharges are intentional, such as dumping used oil (or other pollutant) into catch basins, a contractor illegally tapping a new sewer lateral into a storm drain pipe to avoid the costs of a sewer connection fee and service, and illegal dumping of yard wastes into surface waters.
Some illicit discharges are related to the unsuitability of original infrastructure to the modern regulatory environment. Examples of illicit discharges in this category include connected floor drains in old buildings, as well as sanitary sewer overflows that enter the drainage system. Sump pumps legally

connected to the storm drain system may be used inappropriately, such as for the disposal of floor washwater or old household products, in many cases due to a lack of understanding.

Elimination of some discharges may require substantial costs and efforts, such as funding and designing a project to reconnect sanitary sewer laterals. Others, such as improving self-policing of waste management, can be accomplished by outreach and training in conjunction with commitment to properly dispose of collected waste materials on a regular basis.

Regardless of the intention, when not addressed, illicit discharges can contribute high levels of pollutants, such as heavy metals, toxics, oil, grease, solvents, nutrients, and pathogens to surface waters.

1.3 Allowable Non-Stormwater Discharges

The following categories of non-storm water discharges are allowed under the MS4 Permit unless the permittee, USEPA or Massachusetts Department of Environmental Protection (MassDEP) identifies any category or individual discharge of non-stormwater discharge as a significant contributor of pollutants to the MS4:

- Water line flushing
- Landscape irrigation
- Diverted stream flows
- Rising ground water
- Uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20))
- Uncontaminated pumped groundwater
- Discharge from potable water sources
- Foundation drains
- Air conditioning condensation
- Irrigation water, springs
- Water from crawl space pumps
- Footing drains
- Lawn watering
- Individual car washing
- De-chlorinated swimming pool discharges
- Street wash waters
- Residential building wash waters without detergents

If these discharges are identified as significant contributors to the MS4, they must be considered an "illicit discharge" and addressed in the IDDE Plan (i.e., control these sources so they are no longer significant contributors of pollutants, and/or eliminate them entirely).

1.4 Receiving Waters and Impairments

Table 1-1 lists the "impaired waters" within the boundaries of UMass Chan Medical School's regulated area based on the 2022 Massachusetts Integrated List of Waters produced by MassDEP every two years. Impaired waters are water bodies that do not meet water quality standards for one or more designated use(s) such as recreation or aquatic habitat.

Table 1-1. Impaired Waters

University of Massachusetts Chan Medical School

Water Body Name	Segment ID	Category	Impairment(s)	Associated Approved TMDL
Lake Quinsigamond	MA51125	5	Dissolved Oxygen/DO Saturation, Enterococcus, Curly-leaf Pondweed*, Eurasian Water Milfoil / Myriophyllum Spicatum*, Fanwort*, Non-Native Aquatic Plants*, Water Chestnut*, Algae	*Total Maximum Daily Load of Phosphorus for Lake Quinsigamond and Flint Pond* (CN 115.0)

*TMDL not required (non-pollutant).
Category 4a Waters – impaired water bodies with a completed Total Maximum Daily Load (TMDL).
Category 4c Waters – impaired water bodies where the impairment is not caused by a pollutant. No TMDL required.
Category 5 Waters – impaired water bodies that require a TMDL.
"Approved TMDLs" are those that have been approved by EPA as of the date of issuance of the 2016 MS4 Permit.

1.5 IDDE Program Goals, Framework, and Timeline

The goals of the IDDE program are to find and eliminate illicit discharges to municipal separate storm sewer system and to prevent illicit discharges from happening in the future. The program consists of the following major components as outlined in the MS4 Permit:

- University policy to prohibit illicit discharges and enforce this prohibition,
- Storm system mapping,
- Inventory and ranking of outfalls,
- Dry weather outfall screening,
- Catchment investigations,
- Identification/confirmation of illicit sources,
- Illicit discharge removal,
- Follow-up screening, and
- Employee training.

The IDDE investigation procedure framework is shown in **Figure 1-1.** The required timeline for implementing the IDDE program is shown in **Table 1-2.**

Figure 1-1. IDDE Investigation Procedure Framework

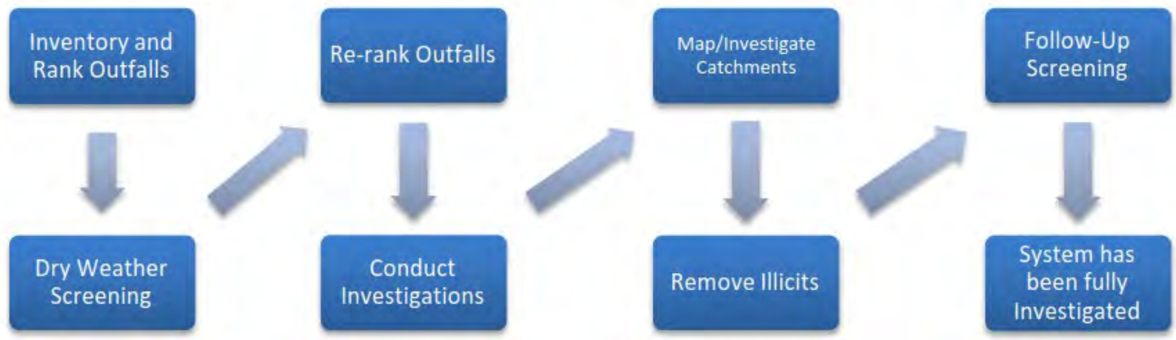

Table 1-2. IDDE Program Implementation Timeline[1]

IDDE Program Requirement	Completion Date from Effective Date of Permit						
	3 Years	4 Years	4.5 Years	5 Years	6 Years	10 Years	13 Years
Written IDDE Program Plan		*X*					
SSO Inventory		*X*					
Written Catchment Investigation Procedure			*X*				
Phase I Mapping				*X*			
Phase II Mapping							*X*
IDDE Regulatory Mechanism	*X*						
Dry Weather Outfall Screening					*X*		
Follow-up Ranking of Outfalls and Interconnections					*X*		
Catchment Investigations – Problem Outfalls						*X*	
Catchment Investigations – all Problem, High and Low Priority Outfalls							*X*

[1] UMass Chan Medical School is categorized as a new permittee since it was not covered under the 2003 MS4 Permit. Per Part 1.10.3 of the MS4 Permit, the IDDE regulatory mechanism or By-Law required by Part 2.3.6 shall be completed as soon as possible, but no later than three (3) years from the permit effective date for new permittees. All other IDDE deadlines required by Part 2.3.6 shall be extended by three (3) years.

1.6 Work Completed to Date

UMass Chan Medical School is categorized as a new permittee since it was not covered under the 2003 MS4 Permit. The following is a summary of the work completed to-date under UMass Chan Medical School's IDDE program.

In Permit Year 3, UMass Chan Medical School developed an Illicit Discharge Policy prohibiting discharges to the UMass Chan Medical School drainage system that are not stormwater. In Permit Year 4, the University conducted Phase I mapping and initial catchment delineations of outfall catchments, in addition to completing the written Illicit Discharge Detection and Elimination (IDDE) Plan.

In Permit Year 5, UMass Chan Medical School completed the following:

- The IDDE Plan was updated with current information based on progress and/or changes to the stormwater program in Permit Year 5, IDDE screening and sampling results, and changes in waterbody statuses (e.g., impairments).
- The Phase I Map that was developed during Permit Year 4 was advanced. The existing public facing web map was also maintained, which includes outfalls, receiving waters, open conveyances, interconnections, and stormwater best management practices (BMPs).
- Screening was conducted on UMass Chan Medical School's outgoing interconnections from the stormwater system for the presence of dry-weather flow and water quality sampling was completed where flow was present. During the inspections, observations were recorded on structure condition, visual and olfactory indications of illicit discharges, and presence of flow. All sampling records are stored in the University's MS4 database. Following the dry weather screening, the outgoing interconnections were ranked based on the screening and sampling results.

In Permit Year 6, UMass Chan Medical School completed the following:

- The IDDE Plan was updated with current information based on progress and/or changes to the stormwater program in Permit Year 6, IDDE screening and sampling results, and changes in waterbody statuses (e.g., impairments).
- The Phase I Map that was developed during Permit Year 4 was advanced. The existing public facing web map was also maintained, which includes outfalls, receiving waters, open conveyances, interconnections, and stormwater best management practices (BMPs).

UMass Chan Medical School has also prepared materials for an IDDE training for facility staff. This training is conducted annually and the training materials are continuously updated.

2 Authority and Statement of IDDE Responsibilities

2.1 Authority

UMass Chan Medical School is required to adopt a campus policy, to provide the University with adequate authority to prohibit illicit discharges and investigate suspected illicit discharges. In Permit Year 3 (Fiscal Year 2021), UMass Chan Medical School developed a IDDE policy in the form of a factsheet. The IDDE policy meets the requirements of the 2016 MS4 Permit, including the authorities listed above.

2.2 Statement of Responsibilities

The IDDE policy referenced above identifies the Environmental Health & Safety Department as responsible for implementing the IDDE program and enforcement.

3 Stormwater System Mapping

The 2016 MS4 Permit requires the storm system map to be updated in two phases as outlined below. The Environmental Health & Safety and Facilities, Engineering & Construction Departments are responsible for updating the stormwater system mapping pursuant to the 2016 MS4 Permit. UMass Chan Medical School will report on the progress towards completion of the storm system map in each annual report. Updates to the stormwater mapping will be included in the online map available at this link: https://umms.maps.arcgis.com/apps/webappviewer/index.html?id=b5a254d1ec284323a9dfd837acec62fc

3.1 Phase I Mapping

Phase I mapping must be completed within five (5) years of the effective date of the permit (July 1, 2023) and include the following information:

- Outfalls and receiving waters
- Open channel conveyances (swales, ditches, etc.)
- Interconnections with other MS4s and other storm sewer systems
- University owned stormwater treatment structures (i.e., Best Management Practices or BMPs)
- Water bodies identified by name and indication of all use impairments as identified on the most recent EPA approved Massachusetts Integrated List of Waters report
- Initial catchment delineations. Topographic contours and drainage system information may be used to produce initial catchment delineations.

UMass Chan Medical School has completed Phase I mapping and initial catchment delineations of outfall catchments.

3.2 Phase II Mapping

Phase II mapping must be completed within 13 years of the effective date of the permit (July 1, 2031) and include the following information:

- Outfall spatial location (latitude and longitude with a minimum accuracy of +/-30 feet)
- Pipes
- Manholes
- Catch basins
- Refined catchment delineations. Catchment delineations must be updated to reflect information collected during catchment investigations.

UMass Chan Medical School will update its stormwater mapping by July 1, 2031 to include the remaining Phase II information.

4 Sanitary Sewer Overflows (SSOs)

The 2016 MS4 Permit requires permittees to prohibit illicit discharges, including sanitary sewer overflows (SSOs), to the separate storm sewer system. SSOs are discharges of untreated sanitary wastewater from a municipal sanitary sewer that can contaminate surface waters, cause serious water quality problems and property damage, and threaten public health. SSOs can be caused by blockages, line breaks, sewer defects that allow stormwater and groundwater to overload the system, power failures, improper sewer design, and vandalism.

Upon detection of an SSO, UMass Chan Medical School will eliminate it as expeditiously as possible and take interim measures to minimize the discharge of pollutants to and from its MS4 until the SSO is eliminated. Upon becoming aware of an SSO to the MS4, UMass Chan Medical School will provide oral notice to EPA within 24 hours and written notice to EPA and MassDEP within five (5) days of becoming aware of the SSO occurrence.

Environmental Health & Safety will update the SSO inventory in this Plan when new SSOs are detected. The SSO inventory will be included in the annual report, including the status of mitigation and corrective measures to address each identified SSO.

5 Assessment and Priority Ranking of Outfalls

The 2016 MS4 Permit requires an assessment and priority ranking of outfalls in terms of their potential to have illicit discharges and SSOs and the related public health significance. The ranking helps determine the priority order for performing IDDE investigations and meeting permit milestones.

5.1 Outfall Catchment Delineations

A catchment is the area that drains to an individual outfall[2] or interconnection.[3] The catchments for each of the MS4 outfalls will be delineated to define contributing areas for investigation of potential sources of illicit discharges. Catchments are typically delineated based on topographic contours and mapped drainage infrastructure, where available. As described in **Section 3**, initial catchment delineations will be completed as part of the Phase I mapping, and refined catchment delineations will be completed as part of the Phase II mapping to reflect information collected during catchment investigations.

5.2 Outfall and Interconnection Inventory and Initial Ranking

The Environmental Health & Safety Department completed an initial outfall and interconnection inventory and priority ranking to assess illicit discharge potential based on existing information. The initial inventory and ranking was completed within four (4) years from the effective date of the permit.

The outfall and interconnection inventory identifies each outfall and interconnection discharging from the MS4, records its location and condition, and provides a framework for tracking inspections, screenings, and other IDDE program activities.

Outfalls and interconnections are classified into one of the following categories:

1. **Problem Outfalls**: Outfalls/interconnections with known or suspected contributions of illicit discharges based on existing information shall be designated as Problem Outfalls. This shall include any outfalls/interconnections where previous screening indicates likely sewer input. Likely sewer input indicators are any of the following:

    - Olfactory or visual evidence of sewage,

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[2] **Outfall** means a point source as defined by 40 CFR § 122.2 as the point where the municipal separate storm sewer discharges to waters of the United States. An outfall does not include open conveyances connecting two municipal separate storm sewers or pipes, tunnels or other conveyances that connect segments of the same stream or other waters of the United States and that are used to convey waters of the United States. Culverts longer than a simple road crossing shall be included in the inventory unless the permittee can confirm that they are free of any connections and simply convey waters of the United States.

[3] **Interconnection** means the point (excluding sheet flow over impervious surfaces) where the permittee's MS4 discharges to another MS4 or other storm sewer system, through which the discharge is conveyed to waters of the United States or to another storm sewer system and eventually to a water of the United States.

- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water, or
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine.

Dry weather screening and sampling, as described in **Section 6** of this IDDE Plan and Part 2.3.4.7.b of the MS4 Permit, is not required for Problem Outfalls.

2. **High Priority Outfalls**: Outfalls/interconnections that have not been classified as Problem Outfalls and that are:

    - Discharging to an area of concern to public health due to proximity of public beaches, recreational areas, drinking water supplies or shellfish beds
    - Determined by the permittee as high priority based on the characteristics listed below or other available information.

3. **Low Priority Outfalls**: Outfalls/interconnections determined by the permittee as low priority based on the characteristics listed below or other available information.

4. **Excluded outfalls**: Outfalls/interconnections with no potential for illicit discharges may be excluded from the IDDE program. This category is limited to roadway drainage in undeveloped areas with no dwellings and no sanitary sewers; drainage for athletic fields, parks or undeveloped green space and associated parking without services; cross-country drainage alignments (that neither cross nor are in proximity to sanitary sewer alignments) through undeveloped land.

Outfalls will be ranked into the above priority categories (<u>except for excluded outfalls, which may be excluded from the IDDE program</u>) based on the following characteristics of the defined initial catchment areas, where information is available. Additional relevant characteristics, including location-specific characteristics, may be considered but must be documented in this IDDE Plan.

- **Past discharge complaints, reports, and screening results.**

- **Discharging to Area of Concern to Public Health** – outfalls or interconnections that discharge to public beaches, recreational areas, drinking water supplies and/or shellfish beds.

- **Impaired Waterbodies –** discharges to waters impaired for bacteria according to the most recent 303(d) list.

- **TMDL Watershed** – discharges to waters with an approved TMDL where illicit discharges may contribute to the pollutant of concern.

- **Density of generating sites within Catchment** – Generating sites are those places, including institutional, municipal, commercial, or industrial sites, with a potential to generate pollutants that could contribute to illicit discharges, based on land use codes or local knowledge.

5.3 Follow-up Ranking of Outfalls and

Interconnections

An updated inventory and ranking will be provided in each annual report. The inventory will be updated annually to include data collected in connection with dry weather screening and other relevant inspections. Based on guidance in the permit, the outfalls identified as Problem Outfalls in Permit Year 4 prioritization remain problem outfalls for the permit requirements. Outfalls/interconnections where dry weather screening information was found indicating sewer input to the MS4, or sampling results indicated sewer input, will be considered likely to contain illicit discharges from sanitary sources and will be ranked at the top of the High Priority Outfalls (Highest) category for investigation.

Table 5-1 provides the most recent UMass Chan Medical School outfall inventory and priority ranking.

Table 5-1. Outfall and Interconnection Inventory and Priority Ranking Matrix

Worcester, Massachusetts
Revision Date: 6/30/2023
Total Outfalls/Interconnections in Urban Area: 7
Problem Outfalls/Interconnections: 0
Highest Priority Outfalls/Interconnections: 1
High Priority Outfalls/Interconnections: 6
Low Priority Outfalls/Interconnections: 0

Outfall ID	Receiving Water		Reports or Complaints of Potential Illicit Discharges?[1]	Discharging to Area of Concern to Public Health?[2]				Receiving Water Quality[3]	TMDL Watershed[4]	Density of Generating Sites within Catchment[5]	Outfalls with Screening Results that Indicate Likely Sewer Input[6]	Score	Priority Ranking
Information Source			UMass Chan Records	a	b	c	d	Impaired Waters List	Mass DEP	Land Use/GIS Maps,	Screening and Sampling Records		
Scoring Criteria			Yes = 40 (Problem outfall) No = 0	Yes = 6 No = 0				Bacteria = 6 Other = 2 None = 0	Yes = 2 No = 0	High = 3 Medium = 2 Low = 0	Yes = 30 No = 0		Problem => 50 Highest Priority => 30 High Priority => 6 Low Priority < 6
A	B	C	D	E	F	G	H	I	K	L		M	N
UMMS_IC_1	MA51125	Lake Quinsigamond via interconnection with City of Worcester MS4	0	0	6	0	0	6	2	3	0	17	High Priority
UMMS_IC_2	MA51125	Lake Quinsigamond via interconnection with City of Worcester MS4	0	0	6	0	0	6	2	3	0	17	High Priority
UMMS_IC_3	MA51125	Lake Quinsigamond via interconnection with City of Worcester MS4	0	0	6	0	0	6	2	3	30	47	Highest Priority
UMMS_IC_4	MA51125	Lake Quinsigamond via interconnection with City of Worcester MS4	0	0	6	0	0	6	2	3	0	17	High Priority
UMMS_IC_5	MA51125	Lake Quinsigamond via interconnection with City of Worcester MS4	0	0	6	0	0	6	2	3	0	17	High Priority
UMMS_IC_6	MA51125	Lake Quinsigamond via interconnection with City of Worcester MS4	0	0	6	0	0	6	2	3	0	17	High Priority
UMMS_IC_7	MA51125	Lake Quinsigamond via interconnection with City of Worcester MS4	0	0	6	0	0	6	2	3	0	17	High Priority

Table 5-1 Scoring Criteria:

[1] Previous reports of dumping, failing septic systems, odors, or other indications of potential illicit discharges.

[2] Outfalls/interconnections that discharge to or in the vicinity of any of the following areas, as determined via GIS evaluation of the following datalayers. Note: Discharges to an area of concern to public health will automatically be considered High Priority.

a. Public Beaches: https://www.mass.gov/info-details/massgis-data-state-designated-barrier-beaches
b. Recreational Areas (note: query layer for only PRIM_PURP = "R" to only review areas protected for recreation primarily): https://www.mass.gov/info-details/massgis-data-protected-and-recreational-openspace
c. Drinking Water Supplies: https://www.mass.gov/info-details/massgis-data-surface-water-supply-watersheds
d. Shellfish Beds: https://www.mass.gov/info-details/massgis-data-designated-shellfish-growing-areas

[3] Receiving water quality based on latest version of MassDEP Integrated List of Waters: https://www.mass.gov/lists/integrated-lists-of-waters-related-reports

- Bacteria: Discharges to waters or their tributaries listed as impaired for bacteria (Category 4a or 5 Waters). This may include waters impaired for Fecal Coliform or Escherichia coli.
  - Note: Discharges to bacteria impaired waters will automatically be considered High Priority, based on guidance provided in Appendix H of the 2016 Permit
- Other: Discharges to waters or their tributaries listed as impaired for pollutants other than bacteria (Category 4a or 5 Waters). This does not include waters impaired for non-pollutants.
- None: Discharges to waters or their tributaries with no water quality impairments (Category 2 or 3 Waters)

[4]Discharges to waters with an approved TMDL where illicit discharges have the potential to contain the pollutant identified as the cause of the impairment. Listing of approved TMDLs can be found here: https://www.mass.gov/lists/total-maximum-daily-loads-by-watershed

[5] Density of generating sites based on MassGIS Land Use layer: https://gisprpxy.itd.state.ma.us/arcgisserver/rest/services/AGOL/LandUse_2005/MapServer

- High Density: Catchment area contains any of the following Land Use Codes = 10, Multi-Family Residential; 11, High Density Residential; 15, Commercial; 16, Industrial; 17, Transitional; 18, Transportation; 19, Waste Disposal; 31, Urban Public/Institutional; 36, Nursery; 39, Junkyard
  - Note: Discharges with known sites with the high potential to generate pollutants that could contribute to illicit discharges within its catchment area should be included in this category. Examples include by are not limited to: car dealers, car washes, gas stations, garden centers, and industrial manufacturing areas.
- Medium Density: 50% or more of catchment area is made of up of Land Use Codes = 5, Mining; 7, Participation Recreation; 8, Spectator Recreation; 9, Water-Based Recreation; 12, Medium Density Residential; 13, Low Density Residential; 26, Golf Course; 29, Marina
- Low Density: 50% or more of catchment area is made of up of Land Use Codes = 1, Cropland; 2, Pasture; 3, Forest; 4, Non-Forested Wetland; 6, Open Land; 14, Saltwater Wetland, 20, Water; 23, Cranberry Bog; 24, Powerline/Utility; 25, Saltwater Sandy Beach; 34, Cemetery; 35, Orchard; 37, Forested Wetland; 38, Very Low Density Residential; 40, Brushland/Successional

[6] Previous screening results indicate likely sewer input if any of the following are true:

- Olfactory or visual evidence of sewage,
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water, or
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine

6 Dry Weather Outfall Screening and Sampling

Dry weather flow is a common indicator of potential illicit connections. The MS4 Permit requires all outfalls/interconnections (excluding Problem and excluded Outfalls) to be inspected for the presence of dry weather flow. The Environmental Health & Safety Department is responsible for conducting dry weather outfall screening, starting with High Priority outfalls, followed by Low Priority outfalls, based on the initial priority rankings described in the previous section.

6.1 Weather Conditions

Dry weather outfall screening and sampling may occur when no more than 0.1 inches of rainfall has occurred in the previous 24-hour period and no significant snow melt is occurring. For purposes of determining dry weather conditions, program staff will use precipitation data from the following weather stations:

- KMAWORCE120 (Lakeview, Worcester) for main campus

6.2 Dry Weather Screening/Sampling Procedure

6.2.1 General Procedure

The dry weather outfall inspection and sampling procedure consists of the following general steps:

1. Identify outfall(s) to be screened/sampled based on initial outfall inventory and priority ranking
2. Acquire the necessary staff, mapping, and field equipment (see **Table 6-1** for list of potential field equipment)
3. Conduct the outfall inspection during dry weather:
    a. Mark and photograph the outfall
    b. Record the inspection information and outfall characteristics (using paper forms or digital form using a tablet or similar device) (see form in **Appendix A**).
    c. Look for and record visual/olfactory evidence of pollutants in flowing outfalls including odor, color, turbidity, and floatable matter (suds, bubbles, excrement, toilet paper or sanitary products). Also observe outfalls for deposits and stains, vegetation, and damage to outfall structures.
4. If flow is observed, sample and test the flow following the procedures described in the following sections.
5. If no flow is observed, but evidence of illicit flow exists (illicit discharges are often intermittent or transitory), revisit the outfall during dry weather within one week of the initial observation, if practicable and necessary, to perform a second dry weather screening and sample any observed flow. Other techniques can be used to detect intermittent or transitory flows including conducting inspections during evenings or weekends and using optical brighteners.
6. Input results from screening and sampling into spreadsheet and/or directly into database with mobile device. Include pertinent information in the outfall/interconnection inventory and priority ranking.
7. Include all screening data in the annual report.

6.2.2 Field Equipment

Table 6-1 lists field equipment commonly used for dry weather outfall screening and sampling. Some may be duplicative (see below).

Table 6-1. Field Equipment – Dry Weather Outfall Screening and Sampling

Equipment	Use/Notes
Clipboard	For organization of field sheets and writing surface
Field Sheets	Field sheets for both dry weather inspection and Dry weather sampling should be available with extras
Mobile Device with Collector or Field Maps, including camera and GPS	Mobile device used for conducting dry weather screening/sampling. Also used for taking photos and geospatial locating of structures.
Chain of Custody Forms	To ensure proper handling of all samples
Pens/Pencils/Permanent Markers	For proper labeling
Nitrile Gloves	To protect the sampler as well as the sample from contamination
Flashlight/headlamp w/batteries	For looking in outfalls or manholes, helpful in early mornings as well
Cooler with Ice	For transporting samples to the laboratory
Digital Camera (or tablet or mobile phone with camera)	For documenting field conditions at time of inspection
Personal Protective Equipment (PPE)	Reflective vest, Safety glasses and boots at a minimum
GPS Receiver (or tablet or mobile phone with GPS)	For taking spatial location data
Water Quality Sonde	If needed, for sampling conductivity, temperature, pH
Water Quality Meter (if needed)	Handheld meters and test kits for testing for various water quality parameters such as ammonia, surfactants, and chlorine. See Table 6-2 below for meters used.
Test Kits	Have extra kits on hand to sample more outfalls than are anticipated to be screened in a single day
Label Tape	For labeling sample containers
Sample Containers	Make sure all sample containers are clean. Keep extra sample containers on hand at all times. Make sure there are proper sample containers for what is being sampled for (i.e., bacteria requires sterile containers).
Pry Bar or Pick	For opening catch basins and manholes when necessary
Sandbags (if needed)	For damming low flows in order to take samples
Small Mallet or Hammer	Helping to free stuck manhole and catch basin covers
Utility Knife	Multiple uses
Measuring Tape	Measuring distances and/or depth of flow
Safety Cones	Safety
Hand Sanitizer	Disinfectant/decontaminant
Zip Ties/Duct Tape	For making field repairs
Rubber Boots/Waders	For accessing shallow streams/areas

Equipment	Use/Notes
Sampling Pole/Dipper/Sampling Cage	For accessing hard to reach outfalls and manholes

6.2.3 Sample Collection and Analysis

If flow is present during a dry weather outfall inspection, a sample will be collected and analyzed for the required permit parameters[4] listed in **Table 6-2**. The general procedure for collection of outfall samples is as follows:

1. At least one day prior to outfall sampling, coordinate with Alpha Analytical (508-898-9220) to schedule the laboratory analysis. This coordination will include the time of delivery and/or courier drop-off and number of samples expected to be sent for analysis. Confirm with Alpha Analytical if any anticipated hold time issues anticipated.
2. Fill out all sample information on sample bottles and field sheets (see **Appendix A** for Sample Labels and Field Sheets).
3. Put on protective gloves (nitrile/latex/other) before sampling.
4. Collect sample with dipper or directly in sample containers. If possible, collect water from the flow directly in the sample bottle, or if necessary, use grab jar and pour into the lab sample bottles, so as to not disturb the preservatives in the sample bottles. Be careful not to disturb sediments.
5. If using a dipper or other device, triple rinse the device with distilled water and/or then in water to be sampled (not for bacteria sampling).
6. Use test strips, test kits, and field meters (rinse similar to dipper) for most parameters (see **Table 6-2**).
7. Place laboratory samples on ice for analysis of bacteria and pollutants of concern.
8. Fill out chain-of-custody form (**Appendix A**) for laboratory samples.
9. Contact Alpha Analytical for lab sample pick up.
10. Dispose of used test strips and test kit ampules properly.
11. Decontaminate all testing personnel and equipment.

In the event that an outfall is submerged, either partially or completely, or inaccessible, field staff will proceed to the first accessible upstream manhole or structure for the observation and sampling and report the location with the screening results. As necessary, field staff will continue to the next upstream structure until there is no longer an influence from the receiving water on the visual inspection or sampling.

Field test kits or field instrumentation are permitted for all parameters except indicator bacteria and any pollutants of concern. Field kits need to have appropriate detection limits and ranges. **Table 6-2** lists various field test kits and field instruments that can be used for outfall sampling associated with the 2016 MS4 Permit parameters, other than indicator bacteria and any pollutants of concern.

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[4] Other potentially useful parameters, although not required by the MS4 Permit, include **fluoride** (indicator of potable water sources in areas where water supplies are fluoridated), **potassium** (high levels may indicate the presence of sanitary wastewater), and **optical brighteners** (indicative of laundry detergents).

Table 6-2. Sampling Parameters and Analysis Methods

Analyte or Parameter	Instrumentation (Portable Meter)	Field Test Kit
Ammonia	NA	Hach™ Ammonia Test Strips
Surfactants (Detergents)	NA	CHEMetrics™ K-9400
Chlorine	CHEMetrics™ V-2000, K-2513 Hach™ DR300 Pocket Colorimeter™ II	NA
Conductivity	EXTECH EC500	NA
Temperature	EXTECH EC500	NA
Salinity	EXTECH EC500	NA
Temperature	EXTECH EC500	NA
Indicator Bacteria: *E. coli* (freshwater) or Enterococcus (saline water)	EPA certified laboratory procedure (40 CFR § 136)	NA
Pollutants of Concern[1]	EPA certified laboratory procedure (40 CFR § 136)	NA

[1] Where the discharge is directly into a water quality limited water or a water subject to an approved TMDL, the sample must be analyzed for the pollutant(s) of concern identified as the cause of the water quality impairment.

Testing for indicator bacteria and any pollutants of concern must be conducted using analytical methods and procedures found in 40 CFR § 136.[5] Samples for laboratory analysis must also be stored and preserved in accordance with procedures found in 40 CFR § 136. **Table 6-3** lists analytical methods, detection limits, hold times, and preservatives for laboratory analysis of dry weather sampling parameters.

[5] 40 CFR § 136: http://www.ecfr.gov/cgi-bin/text-idx?SID=b3b41fdea0b7b0b8cd6c4304d86271b7&mc=true&node=pt40.25.136&rgn=div5

Table 6-3. Required Analytical Methods, Detection Limits, Hold Times, and Preservatives[4]

Analyte or Parameter	Analytical Method	Detection Limit	Max. Hold Time	Preservative
Ammonia	**EPA**: 350.2, **SM**: 4500-NH3C	0.05 mg/L	28 days	Cool ≤6°C, H_2SO_4 to pH <2, No preservative required if analyzed immediately
Surfactants	**SM**: 5540-C	0.01 mg/L	48 hours	Cool ≤6°C
Chlorine	**SM**: 4500-Cl G	0.02 mg/L	Analyze within 15 minutes	None Required
Temperature	**SM**: 2550B	*NA*	Immediate	None Required
Specific Conductance	**EPA**: 120.1, **SM**: 2510B	0.2 µs/cm	28 days	Cool ≤6°C
Salinity	**SM**: 2520	-	28 days	Cool ≤6°C
Indicator Bacteria: *E.coli* Enterococcus	*E.coli* **EPA**: 1603 **SM**: 9221B, 9221F , 9223 B **Other**: Colilert®, Colilert-18® *Enterococcus* **EPA**: 1600 **SM**: 9230 C **Other**: Enterolert®	*E.coli* **EPA**: 1 cfu/100mL **SM**: 2 MPN/100mL **Other**: 1 MPN/100mL *Enterococcus* **EPA**: 1 cfu/100mL **SM**: 1 MPN/100mL **Other**: 1 MPN/100mL	8 hours	Cool ≤10°C, 0.0008% $Na_2S_2O_3$
Total Phosphorus	**EPA**: Manual-365.3, Automated Ascorbic acid digestion-365.1 Rev. 2, ICP/AES4-200.7 Rev. 4.4 **SM**: 4500-P E-F	**EPA**: 0.01 mg/L **SM** : 0.01 mg/L	28 days	Cool ≤6°C, H_2SO_4 to pH <2
Total Nitrogen (Ammonia + Nitrate/Nitrite, methods are for Nitrate-Nitrite and need to be combined with Ammonia listed above.)	**EPA**: Cadmium reduction (automated)-353.2 Rev. 2.0, **SM**: 4500-NO_3 E-F	**EPA**: 0.05 mg/L **SM** : 0.05 mg/L	28 days	Cool ≤6°C, H_2SO_4 to pH <2

SM = Standard Methods

6.3 Interpreting Outfall Sampling Results

Outfall analytical data from dry weather sampling can be used to help identify the major type or source of discharge. **Table 6-4** shows values identified by the U.S. EPA and the Center for Watershed Protection as typical screening values for select parameters. These represent the typical concentration (or value) of each parameter expected to be found in stormwater. Screening values that exceed these benchmarks may be indicative of pollution and/or illicit discharges.

Table 6-4. Benchmark Field Measurements for Select Parameters

Analyte or Parameter	Benchmark
Ammonia	>0.5 mg/L
Conductivity	>2,000 µS/cm
Surfactants	>0.25 mg/L
Chlorine	>0.02 mg/L (detectable levels per the 2016 MS4 Permit)
Indicator Bacteria[6]: *E.coli* *Enterococcus*	*E.coli*: the geometric mean of the five most recent samples taken during the same bathing season shall not exceed 126 colonies per 100 ml and no more than 10% of all such samples taken during the bathing season shall exceed 410 colonies per 100 ml *Enterococcus:* the geometric mean of the five most recent samples taken during the same bathing season shall not exceed 35 colonies per 100 ml and no more than 10% of all such samples taken during the bathing season shall exceed 130 colonies per 100 ml

[6] Massachusetts Water Quality Standards: http://www.mass.gov/eea/docs/dep/service/regulations/314cmr04.pdf

7 Catchment Investigations

Once stormwater outfalls with evidence of illicit discharges have been identified, various methods can be used to trace the source of the potential discharge within the outfall catchment area. Catchment investigation techniques include but are not limited to review of maps, historic plans, and records; manhole observation; dry and wet weather sampling; video inspection; smoke testing; and dye testing. This section outlines a systematic procedure to investigate outfall catchments to trace the source of potential illicit discharges. All data collected as part of the catchment investigations will be recorded and reported in each annual report.

7.1 System Vulnerability Factors

The Environmental Health & Safety Department will review relevant mapping and historic plans and records to identify areas within the catchment with higher potential for illicit connections. The following information will be reviewed:

- Plans related to the construction of the drainage network
- Prior work on storm drains
- Complaint records related to SSOs

Based on the review of this information, the presence of any of the following **System Vulnerability Factors (SVFs)** will be identified for each catchment:

- History of SSOs, including, but not limited to, those resulting from wet weather, high water table, or fat/oil/grease blockages
- Any storm drain infrastructure greater than 40 years old
- Widespread code-required septic system upgrades required at property transfers (indicative of inadequate soils, water table separation, or other physical constraints of the area rather than poor owner maintenance)
- History of multiple actions addressing widespread septic system failures (indicative of inadequate soils, water table separation, or other physical constraints of the area rather than poor owner maintenance).

A SVF inventory will be documented for each catchment (see **Table 7-1**), retained as part of this IDDE Plan, and included in the annual report.

Table 7-1. Outfall Catchment System Vulnerability Factor (SVF) Inventory

University of Massachusetts Chan Medical School
Revision Date: June 30, 2022

Outfall ID	Receiving Water	1 History of SSOs	2 Storm Drain Infrastructure >40 years Old	3 Septic with Poor Soils or Water Table Separation	4 History of Actions Addressing Septic Failure
Sample 1	XYZ River	Yes/No	Yes/No	Yes/No	Yes/No

Presence/Absence Evaluation Criteria:

1. History of SSOs, including, but not limited to, those resulting from wet weather, high water table, or fat/oil/grease blockages
2. Any storm drain infrastructure greater than 40 years old
3. Widespread code-required septic system upgrades required at property transfers (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance)
4. History of multiple actions addressing widespread septic system failures (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance)

7.2 Dry Weather Manhole Inspections

UMass Chan Medical School will implement a dry weather storm drain network investigation that involves systematically and progressively observing, sampling and evaluating key junction manholes in the MS4 to determine the approximate location of suspected illicit discharges or SSOs.

The Environmental Health & Safety Department will be responsible for implementing the dry weather manhole inspection program and making updates as necessary. Infrastructure information will be incorporated into the storm system map, and catchment delineations will be refined based on the field investigation, where necessary. The SVF inventory will also be updated based on information obtained during the field investigations, where necessary.

Several important terms related to the dry weather manhole inspection program are defined by the MS4 Permit as follows:

- **Junction Manhole** is a manhole or structure with two or more inlets accepting flow from two or more MS4 alignments. Manholes with inlets solely from private storm drains, individual catch basins, or both are not considered junction manholes for these purposes.

- **Key Junction Manholes** are those junction manholes that can represent one or more junction manholes without compromising adequate implementation of the illicit discharge program. Adequate implementation of the illicit discharge program would not be compromised if the exclusion of a particular junction manhole as a key junction manhole would not affect the permittee's ability to determine the possible presence of an upstream illicit discharge. A permittee may exclude a junction manhole located upstream from another located in the immediate vicinity or that is serving a drainage alignment with no potential for illicit connections.

For all catchments identified for investigation, during dry weather, field crews will systematically inspect **key junction manholes** for evidence of illicit discharges. This program involves progressive inspection and sampling at manholes in the storm drain network to isolate and eliminate illicit discharges.

The manhole inspection methodology will be conducted in one of two ways (or a combination of both):

- By working progressively up from the outfall and inspecting key junction manholes along the way, or
- By working progressively down from the upper parts of the catchment toward the outfall.

For most catchments, manhole inspections will proceed from the outfall moving up into the system. However, the decision to move up or down the system depends on the nature of the drainage system and the surrounding land use and the availability of information on the catchment and drainage system. Moving up the system can begin immediately when an illicit discharge is detected at an outfall, and only a map of the storm drain system is required. Moving down the system requires more advance preparation and reliable drainage system information on the upstream segments of the storm drain system, but may be more efficient if the sources of illicit discharges are believed to be located in the upstream portions of the catchment area. Once a manhole inspection methodology has been selected, investigations will continue systematically through the catchment.

Inspection of key junction manholes will proceed as follows:

1. Manholes will be opened and inspected for visual and olfactory evidence of illicit connections. A sample field inspection form is provided in **Appendix A**.

2. If flow is observed, a sample will be collected and analyzed at a minimum for ammonia, chlorine, and surfactants. Field kits can be used for these analyses. Sampling and analysis will be in accordance with procedures outlined in **Section 6**. Additional indicator sampling may assist in determining potential sources (e.g., bacteria for sanitary flows, conductivity to detect tidal backwater, etc.).

3. Surrounding areas will be reviewed for potential overland sources of flow or pollutant inputs. Examples include PVC pipes from sump pumps, leaky dumpsters, material storage or

stockpiles, etc. If potential overland sources are identified, photographs will be taken and notes will be documented in the inspection form. If flow from an overland source is observed, a sample of the flow will be collected as close to the sources as possible.

4. Where sampling results or visual or olfactory evidence indicate potential illicit discharges or SSOs, the area draining to the junction manhole will be flagged for further upstream manhole investigation and/or isolation and confirmation of sources.

5. Subsequent key junction manhole inspections will proceed until the location of suspected illicit discharges or SSOs can be isolated to a pipe segment between two manholes.

6. If no evidence of an illicit discharge is found, catchment investigations will be considered complete upon completion of key junction manhole sampling.

7.3 Wet Weather Outfall Sampling

Where a minimum of one (1) System Vulnerability Factor (SVF) is identified based on previous information or the catchment investigation, a wet weather investigation must also be conducted at the associated outfall. The Environmental Health & Safety Department will be responsible for implementing the wet weather outfall sampling program and making updates as necessary.

Outfalls will be inspected and sampled under wet weather conditions, to the extent necessary, to determine whether wet weather-induced high flows in sanitary sewers or high groundwater in areas served by septic systems result in discharges of sanitary flow to the MS4.

Wet weather outfall sampling will proceed as follows:

1. At least one wet weather sample will be collected at the outfall for the same parameters required during dry weather screening.

2. Wet weather sampling will occur during or after a storm event of sufficient depth or intensity to produce a stormwater discharge at the outfall. There is no specific rainfall amount that will trigger sampling. To the extent feasible, sampling should occur during the spring (March through June) when groundwater levels are relatively high.

3. If wet weather outfall sampling indicates a potential illicit discharge, then additional wet weather source sampling will be performed, as warranted, or source isolation and confirmation procedures will be followed as described in **Section 7.4**.

4. If wet weather outfall sampling does not identify evidence of illicit discharges, and no evidence of an illicit discharge is found during dry weather manhole inspections, catchment investigations will be considered complete.

7.4 Source Isolation and Confirmation

Once the source of an illicit discharge is approximated between two manholes, more detailed investigation techniques will be used to isolate and confirm the source of the illicit discharge. The following methods may be used in isolating and confirming the source of illicit discharges:

- Sandbagging
- Smoke Testing
- Dye Testing
- CCTV/Video Inspections
- Optical Brightener Monitoring
- IDDE Canines
- Human vs Animal DNA Testing

These methods are described in the sections below.

Public notification is an important aspect of a detailed source investigation program. Prior to smoke testing, dye testing, or TV inspections, the Environmental Health & Safety Department will notify the campus community using multiple communication channels.

7.4.1 Sandbagging

This technique can be particularly useful when attempting to isolate intermittent illicit discharges or those with very little perceptible flow. The technique involves placing sandbags or similar barriers (e.g., caulking, weirs/plates, or other temporary barriers) within outlets to manholes to form a temporary dam that collects any intermittent flows that may occur. Sandbags are typically left in place for 48 hours, and should only be installed when dry weather is forecast. If flow has collected behind the sandbags/barriers after 48 hours it can be assessed using visual observations or by sampling. If no flow collects behind the sandbag, the upstream pipe network can be ruled out as a source of the intermittent discharge. Finding appropriate durations of dry weather and the need for multiple trips to each manhole makes this method both time-consuming and somewhat limiting.

7.4.2 Smoke Testing

Smoke testing involves injecting non-toxic smoke into drain lines and noting the emergence of smoke from sanitary sewer vents in illegally connected buildings or from cracks and leaks in the system itself. Typically a smoke bomb or smoke generator is used to inject the smoke into the system at a catch basin or manhole and air is then forced through the system. Test personnel are placed in areas where there are suspected illegal connections or cracks/leaks, noting any escape of smoke (indicating an illicit connection or damaged storm drain infrastructure). It is important when using this technique to make proper notifications to staff and students as well as local police and fire departments.

If the initial test of the storm drain system is unsuccessful then a more thorough smoke-test of the sanitary sewer lines can also be performed. Unlike storm drain smoke tests, buildings that do not emit smoke during sanitary sewer smoke tests may have problem connections and may also have sewer gas venting inside, which is hazardous.

It should be noted that smoke may cause minor irritation of respiratory passages. Staff and students with respiratory conditions may need to be monitored or evacuated from the area of testing altogether to ensure safety during testing.

7.4.3 Dye Testing

Dye testing involves flushing non-toxic dye into plumbing fixtures such as toilets, showers, and sinks and observing nearby storm drains and sewer manholes as well as stormwater outfalls for the presence of the dye. Similar to smoke testing, it is important to inform staff and students. Police, fire, and local public health staff should also be notified prior to testing in preparation of responding to citizen phone calls concerning the dye and their presence in local surface waters.

A team of two or more people is needed to perform dye testing (ideally, all with two-way radios). One person is inside the building, while the others are stationed at the appropriate storm sewer and sanitary sewer manholes (which should be opened) and/or outfalls. The person inside the building adds dye into a plumbing fixture (i.e., toilet or sink) and runs a sufficient amount of water to move the dye through the plumbing system. The person inside the building then radios to the outside crew that the dye has been dropped, and the outside crew watches for the dye in the storm sewer and sanitary sewer, recording the presence or absence of the dye.

The test can be relatively quick (about 30 minutes per test), effective (results are usually definitive), and inexpensive. Dye testing is best used when the likely source of an illicit discharge has been narrowed down to a few specific buildings.

7.4.4 CCTV/Video Inspection

Another method of source isolation involves the use of mobile video cameras that are guided remotely through stormwater drain lines to observe possible illicit discharges. IDDE program staff can review the videos and note any visible illicit discharges. While this tool is both effective and usually definitive, it can be costly and time consuming when compared to other source isolation techniques.

7.4.5 Optical Brightener Monitoring

Optical brighteners are fluorescent dyes that are used in detergents and paper products to enhance their appearance. The presence of optical brighteners in surface waters or dry weather discharges suggests there is a possible illicit discharge or insufficient removal through adsorption in nearby septic systems or wastewater treatment. Optical brightener monitoring can be done in two ways. The most common, and least expensive, methodology involves placing a cotton pad in a wire cage and securing it in a pipe, manhole, catch basin, or inlet to capture intermittent dry weather flows. The pad is retrieved at a later date and placed under UV light to determine the presence/absence of brighteners during the monitoring period. A second methodology uses handheld fluorometers to detect optical brighteners in water sample collected from outfalls or ambient surface waters. Use of a fluorometer, while more quantitative, is typically more costly and is not as effective at isolating intermittent discharges as other source isolation techniques.

7.4.6 IDDE Canines

Dogs specifically trained to smell human related sewage are becoming a cost-effective way to isolate and identify sources of illicit discharges. While not widespread at the moment, the use of IDDE canines is growing as is their accuracy. The use of IDDE canines is not recommended as a standalone practice for source identification; rather it is recommended as a tool to supplement other conventional methods, such as dye testing, in order to fully verify sources of illicit discharges.

7.4.7 Human vs Animal DNA testing

One additional method of source isolation can be conducted through laboratory testing. There are labs that can determine the source of the bacteria levels by classifying the DNA present as human or animal (dog, bird, horse, etc.). This can be used to confirm that there is truly an illicit discharge in the system, and the suspicious water quality parameters were not from surface flow into the closed drainage system.

7.5 Illicit Discharge Removal

When the specific source of an illicit discharge is identified, UMass Chan Medical School will exercise its authority as necessary to require its removal. The annual report will include the status of IDDE investigation and removal activities including the following information for each confirmed source:

- The location of the discharge and its source(s)
- A description of the discharge
- The method of discovery
- Date of discovery
- Date of elimination, mitigation or enforcement action OR planned corrective measures and a schedule for completing the illicit discharge removal
- Estimate of the volume of flow removed.

7.5.1 Confirmatory Outfall Screening

Within one (1) year of removal of all identified illicit discharges within a catchment area, confirmatory outfall or interconnection screening will be conducted. The confirmatory screening will be conducted in dry weather unless System Vulnerability Factors have been identified, in which case both dry weather and wet weather confirmatory screening will be conducted. If confirmatory screening indicates evidence of additional illicit discharges, the catchment will be scheduled for additional investigation.

7.6 Ongoing Screening

Upon completion of all catchment investigations and illicit discharge removal and confirmation (if necessary), each outfall or interconnection will be re-prioritized for screening and scheduled for ongoing screening once every five (5) years. Ongoing screening will consist of dry weather screening and sampling consistent with the procedures described in **Section 6** of this plan. Ongoing wet weather screening and sampling will also be conducted at outfalls where wet weather screening was required due to System Vulnerability Factors and will be conducted in accordance with the procedures described in **Section 7.3**. All sampling results will be reported in the annual report.

8 Training

Annual IDDE training will be made available to all employees involved in the IDDE program. This training will at a minimum include information on how to identify illicit discharges and SSOs and may also include additional training specific to the functions of particular personnel and their function within the framework of the IDDE program. Training records will be maintained in **Appendix B**. The frequency and type of training will be included in the annual report.

9 Progress Reporting

The progress and success of the IDDE program will be evaluated on an annual basis. The evaluation will be documented in the annual report and will include the following indicators of program progress:

- Number of SSOs and illicit discharges identified and removed
- Number and percent of total outfall catchments served by the MS4 evaluated using the catchment investigation procedure
- Number of dry weather outfall inspections/screenings
- Number of wet weather outfall inspections/sampling events
- Number of enforcement notices issued
- All dry weather and wet weather screening and sampling results
- Estimate of the volume of sewage removed, as applicable
- Number of employees trained annually.

The success of the IDDE program will be measured by the IDDE activities completed within the required permit timelines.

Appendix A

Field Forms, Sample Bottle Labels, and Chain of Custody Forms

UMass Chan Medical School Bottle Label

Water Quality Sampling Program Sample

Sample ID:__________

Laboratory Analysis: ____________________________

Preservative:__(pre-populated by lab)_______

Date:____

Time:____

Collected By: ___________________________________

Bottle Type:______(pre-populated by lab)____________

UMass Chan Medical School Inspection Form

IDDE Outfall Screening Form
Inspection Date:
Inspector Name:
Start Time:
Structure Found: ☐ Yes ☐ No
Type of Inspection: ☐ Dry Weather ☐ Wet Weather
Date of Last Storm:
Outfall Condition:
Outfall Condition: ☐ Good: Inspect Within 2 Years ☐ Fair: Inspect Within 1 Year ☐ Failing: Requires Immediate Action ☐ Poor: Requires Maintenance ☐ Unknown
Sedimentation: ☐ No Sedimentation ☐ Slight Sedimentation ☐ High Sedimentation
Illicit Discharge Potential: ☐ Potential ☐ Obvious ☐ Unlikely
Reason for Illicit Suspicion:
Visual Inspection:
Staining: ☐ No Staining ☐ Some Staining ☐ Significant Staining
Scour Protection Condition: ☐ Good: Inspect Within 2 Years ☐ Fair: Inspect Within 1 Year ☐ Failing: Requires Immediate Action ☐ Poor: Requires Maintenance ☐ Unknown
Vegetative Growth: ☐ None ☐ < 25% Vegetated ☐ < 50% Vegetated ☐ 50% Vegetated ☐ > 50% Vegetated ☐ 100% Vegetated
Flow: ☐ Yes ☐ No
Flow Clarity: ☐ Clear ☐ Cloudy ☐ Opaque
Color of Flow: ☐ N/A ☐ Clear ☐ Tea/Coffee ☐ Clear Black ☐ Orange-Red ☐ Tan to Light Brown ☐ Milky/Dirty Dishwater Gray ☐ Milky White ☐ White Crusty Deposits ☐ Greenish-Bluish ☐ Blue ☐ Purple ☐ Dark Red ☐ Other (describe in notes)
Floatables: ☐ Yes ☐ No
Sewage, Sheens & Scum: ☐ Yes ☐ No
Visual evidence of sewage?: ☐ Yes ☐ No
Odor: ☐ None ☐ Rotten Eggs/Hydrogen Sulfide ☐ Musty Odor ☐ Sharp, Pungent ☐ Sweet, Fruit ☐ Gasoline, Petroleum ☐ Chlorine ☐ Other (describe in notes)
Water Quality Sampling
Temperature (deg C):
Conductivity (micro-Siemens/cm):
pH:
Salinity (ppm):
Ammonia (mg/L):
Chlorine (mg/L):
Surfactants (mg/L):
Additional Parameters Screened:
Sample for Lab Collected: ☐ Yes ☐ No
Lab Sample 1 Test:

Lab Sample 1 Results:
Lab Sample 2 Test:
Lab Sample 2 Results:
Lab Sample 3 Test:
Lab Sample 3 Results:
Lab Sample 4 Test:
Lab Sample 4 Results:
Lab Sample 5 Test:
Lab Sample 5 Results:
Lab Sample 6 Test:
Lab Sample 6 Results:
Lab Sample 7 Test:
Lab Sample 7 Results:
Follow-Up Investigation Needed?
Notes:
End Time:

Example Chain of Custody Form from Alpha Analytical (acquired by Pace Labs in Spring 2024)

CHAIN OF CUSTODY

PAGE 1 OF 1

ALPHA

Date Rec'd in Lab: 5/25/21

ALPHA Job #: L2127178

Client Information

Client: ~~Walfacco~~ VHB
Address: 101 Walnut St
Watertown, MA 02471
Phone: 617. 607. 6164
Email: npacheco@vhb.com

Additional Project Information:

Project Information

Project Name: Halifax IDDE
Project Location: Halifax, MA
Project #:
Project Manager:
ALPHA Quote #:

Turn-Around Time

☑ Standard ☐ RUSH
Date Due:

Report Information - Data Deliverables

☐ ADEx ☐ EMAIL

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods
☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☐ No NPDES RGP
☑ Other State /Fed Program CWA MS4 Criteria

ANALYSIS: VOC: ☐ 8260 ☐ 624 ☐ 524.2; SVOC: ☐ ABN ☐ PAH; METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15; METALS: ☐ RCRA 5 ☐ RCRA8 ☐ PP13; EPH: ☐ Ranges & Targets ☐ Ranges Only; VPH: ☐ Ranges & Targets ☐ Ranges Only; ☐ PCB ☐ PEST; TPH: ☐ Quant Only ☐ Fingerprint

SAMPLE INFO: Filtration ☐ Field ☐ Lab to do; Preservation ☐ Lab to do

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	E.coli	Total Phosphorus	TSS	Sample Comments	Total # Bottles
27171-01	OT-07	5/24	9:30	SW	NP	X				1
-02	OE-03	5/24	10:30	SW	NP	X	X	X		3
-06	Cb1228	5/24	11:30	SW	NP	X				1
-07	OWR-16	5/24	12:00	SW	NP	X				1
		5/24		SW	NP					
		5/24		SW	NP					
		5/24		SW	NP					
Container Type						P	P	P		
Preservative						H	D	A		

Container Type: P= Plastic, A= Amber glass, V= Vial, G= Glass, B= Bacteria cup, C= Cube, O= Other, E= Encore, D= BOD Bottle

Preservative: A= None, B= HCl, C= HNO_3, D= H_2SO_4, E= NaOH, F= MeOH, G= $NaHSO_4$, H = $Na_2S_2O_3$, I= Ascorbic Acid, J = NH_4Cl, K= Zn Acetate, O= Other

Relinquished By:	Date/Time	Received By:	Date/Time
[redacted]	5/25 1:30pm	[redacted]	5/25/21 13:30
	5/25/21		5/25/21 1546
	5/25/21 1815		5/25/21 1815

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

Appendix B

IDDE Employee Training Record

**Illicit Discharge Detection and Elimination (IDDE)
Employee Training Record**

University of Massachusetts Chan Medical School

Date	Title	Approximate Number of Attendees	Duration	Topics Covered
12/16/2021	Bay State Roads IDDE Training for MS4 Permitting	2	2 hours	This training focuses on Year 4 and future IDDE requirements and discusses best practices for implementation of IDDE programs.
2022 (training is required annually on date of hire)	Stormwater Awareness Safety Module (incorporated into Off-Site/Powerplant Facilities online training)	96	0.5 hours	This training focuses on characteristics of non-allowable dry weather discharges and how to identify and report potential illicit discharges in the field.
2023 (training is required annually on date of hire)	Stormwater Awareness Safety Module (incorporated into Off-Site/Powerplant Facilities online training)	100	0.5 hours	This training focuses on characteristics of non-allowable dry weather discharges and how to identify and report potential illicit discharges in the field.
2024 (training is required annually on date of hire)	Stormwater Awareness Safety Module (incorporated into Off-Site/Powerplant Facilities online training)	100	0.5 hours	This training focuses on characteristics of non-allowable dry weather discharges and how to identify and report potential illicit discharges in the field.

Appendix D – MS4 Infrastructure Plan

UMass Chan
MEDICAL SCHOOL

University of Massachusetts Chan Medical School

Operations and Maintenance (O&M) Plan

For Coverage Under The

National Pollutant Discharge Elimination System (NPDES)
General Permit for Municipal Separate Storm Sewer Systems (MS4)

Updated June 30, 2024

This document was compiled based on a template created by VHB for use by MS4 clients developed by modifying a template and standard operating procedures (SOPs) from the Central Massachusetts Regional Stormwater Coalition (CMRSWC).

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Appendix A: SPCC Plan

Appendix B: Winter Road Maintenance Best Practices Details

1 Introduction

This Operation and Maintenance (O&M) Plan covers the University of Massachusetts Chan Medical School (UMass Chan Medical School) facilities, infrastructure, and other assets, with sections organized around the following categories:

- Open space,
- Building and facilities,
- Vehicles and equipment,
- Catch basins,
- Streets and parking lots,
- Winter road maintenance, and
- Structural stormwater best management practices (BMPs).

The O&M Plan outlines inspection and maintenance procedures for these assets and facilities. There are two appendices with additional details covering winter road maintenance and spill prevention and control.

This O&M Plan has been prepared by UMass Chan Medical School in part to address O&M requirements[1] of the United States Environmental Protection Agency's (USEPA) 2016 National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in Massachusetts, hereafter referred to as "the permit, "2016 Massachusetts MS4 Permit," or "MS4 Permit."

More specifically, this plan addresses Minimum Control Measure 6, Good Housekeeping and Pollution Prevention for Permittee Owned Operations, by describing the activities and procedures UMass Chan Medical School will implement so that infrastructure is maintained in a timely manner to reduce the discharge of pollutants from the MS4. This document fulfills the permit requirement for UMass Chan Medical School to develop an inventory and written (hardcopy or electronic) operations and maintenance procedures for open spaces, buildings and facilities, vehicles and equipment, and infrastructure within four (4) years of the effective date of the permit. These details are outlined in Section 2.3.7.A of the MS4 Permit.

Employees and contractors who conduct maintenance and operations of campus open space, buildings, vehicles and equipment, streets and parking lots, and stormwater infrastructure are given a copy of this plan and provided with regular training on best practices.

[1] See Part 2.3.7.a.iii of the 2016 MS4 Permit for Infrastructure Operation and Maintenance program requirements.

2 Open Space

2.1 Overview and Inventory

This section establishes procedures for operations and maintenance of campus open spaces owned and operated by UMass Chan Medical School, as required in the permit. The following MS4 Permit requirements are addressed in this section:

- Develop an inventory of all campus open space owned by the permittee;
- Evaluate lawn maintenance and landscaping activities to ensure practices are protective of water quality, including reduced mowing frequencies, proper disposal of lawn clippings, and use of alternative landscaping materials (e.g., drought resistant planting);
- Establish procedures for management of trash containers in open spaces (scheduled cleanings; sufficient number);
- Establish procedures to address the proper use, storage, and disposal of pesticides, herbicides, and fertilizers including minimizing the use of these products and using only in accordance manufacturer's instruction;
- Establish procedures to address waterfowl congregation areas where appropriate to reduce waterfowl droppings from entering the MS4; and
- Establish procedures to address erosion or poor vegetative cover when the permittee becomes aware of it; especially if the erosion is within 50 feet of a surface water.

Section 2.2 includes UMass Chan Medical School's approach to these requirements.

Table 1 lists the campus open space owned and operated by UMass Chan Medical School, to which these O&M procedures apply.

Table 1 Inventory of Campus Open Spaces

Name	Address or Location	Size (acres)	Responsible Department	Features	Pesticides, Herbicides, and/or Fertilizer Used (Y/N)
Quad 1	North of South Road	1.4	Facilities Maintenance	Lawn	Y
Quad 2	North of South Road	1.5		Lawn	Y
Quad 3	South of South Road	1.4		Lawn	Y
Quad 4	South of South Road	1.9		Lawn	Y

2.2 O&M Procedures

Maintaining campus open space is important for the quality of life of UMass Chan Medical School's faculty, staff, students and visitors. This section focuses on procedures to protect the water quality of waterbodies in and around UMass Chan Medical School campus by preventing pollutants in campus open space from being carried in stormwater runoff to nearby waterbodies. UMass Chan Medical School will implement the following procedures in open spaces to reduce the discharge of pollutants from the MS4. **Table 1** describes these open spaces.

2.2.1 Mowing and Landscaping

Table 1 summarizes the spaces at UMass Chan Medical School which have lawns and landscaping. Grass clippings and other organic wastes from these sites are stored in an area outside of the 3rd level of the West garage, and then disposed of off-site.

As indicated in UMass Chan Medical School's Stormwater Management Program (SWMP), UMass Chan Medical School discharges into phosphorus impaired waterbodies or tributaries. Under MS4 Permit requirements, UMass Chan Medical School acknowledges that blowing organic waste material (grass cuttings, leaf litter) into the waterbody is strictly prohibited.

Mowing and Landscaping Best Practices

Mowing

- Mow grass to 2-3 inches in height for water retention and weed control.
- Mow frequently, while cutting no more than one third of grass height per mowing.
- Reduce mowing frequencies wherever possible by establishing low/no-mow areas in lesser-used spaces.
- Remove debris and trash from landscaped areas prior to mowing.
- Collect grass clippings and leaves after mowing. Do not blow or wash them into the street, gutter, or storm drains.
- Keep mowing equipment in good state of repair, including sharp blades and well-oiled lawn mowers and maintain equipment over grassy areas or in contained washout areas that do not drain to MS4 or directly to surface water waters.
- Follow proper fueling procedures of equipment to guard against petroleum products from mistakenly entering the stormwater system.
- When establishing new plantings, use alternative landscaping material such as drought resistant plants, and native plants, based on site conditions (e.g., sunlight, wetness, slope, use) and to reduce the need for irrigation and fertilizers and pesticides.

Irrigation

- Only irrigate at a rate that can infiltrate into the soil to limit run-off.
- Irrigate in the early morning; use irrigation water conservatively; and direct irrigation equipment to appropriate vegetated areas, rather than sidewalks, parking lots, or driveways.

- Avoid irrigating close to impervious surfaces such as parking lots and sidewalks.
- Turn off irrigation systems during periods of adequate rainfall.
- Repair broken sprinkler heads as soon as possible

2.2.2 Trash and Trash Container Management

In open space sites which have trash and/or recycling receptacles, these receptacles are emptied and inspected according to a weekly schedule (more frequently, as needed). UMass Chan Medical School follows the best practices outlined in Section 3.2.2 Trash and Recyclables Management for trash receptables within campus open space. Trash docks are located indoors. Generally, receptacles are not placed or washed in areas where they could leak or overflow directly to the MS4 or a water resource.

2.2.3 Pesticides, Herbicides, and Fertilizer Use

UMass Chan Medical School minimizes the use of pesticides, herbicides, and fertilizers in an effort to protect surrounding waterbodies. Standards set forth in Massachusetts regulations on plant nutrient application (330 CMR 31.00) are followed. The state requirements for fertilizers can be found here: https://www.mass.gov/doc/330-cmr-31-plant-nutrient-application-requirements-for-agricultural-land-and-non-agricultural/download. As required by the State, only fertilizer, pesticide, and herbicide products registered with the Department of Agricultural Resources are used.

Proper approval from the applicable Conservation Commission is obtained before applying chemicals within 25 feet of resource areas as defined in the MA Wetlands Protection Act.

In accordance with TMDL and impaired waterbody requirements of the MS4 Permit, UMass Chan Medical School will use slow-release fertilizers in addition to reducing fertilizer use to reduce runoff to nutrient impaired waterbodies, as indicated in UMass Chan Medical School's SWMP. Phosphorus will only be applied in areas where a soil test indicates that it is not present in sufficient quantities. Where possible, UMass Chan Medical School will use phosphorus-free fertilizer options.

Chemical storage, including pesticides, herbicides, and fertilizers, follows the procedures outlined in Section 3.2.1 Use, Storage and Disposal of Potential Pollutants.

Pesticides, Herbicides, and Fertilizer Use Best Practices

General

- Avoid application over impervious surfaces.
- Clean up any spills with dry clean up methods (i.e., do not hose down a spill site).
- Do not hose down paved areas after application to a storm drain or drainage ditch.
- Read all labels and use products only as directed.
- Mix chemicals using clean application equipment under cover in an area where accidental spills will not enter surface water or groundwater and will not contaminate the soil.
- Spot treat infected areas instead of the entire location.
- Calibrate application equipment regularly to ensure proper application and loading rates.

Fertilizers

- Test soils before applying fertilizer to determine what nutrients need to be supplemented. Prepare and apply only as much chemical as is needed.
- Do not apply fertilizers in the following conditions:
  - Between December 1 and March 1
  - To frozen and/or snow-covered soil
  - To saturated soils or soils that are frequently flooded
  - When rain is forecast for 24 hours
- Time fertilizer application methods for maximum plant uptake, usually in the fall and spring (e.g., between April 15 and October 15). When applying at the beginning and end of planting season, take into consideration the slower uptake rate of fertilizer by plants and adjust the fertilizer application accordingly.
- Fertilizers should only be applied by properly trained personnel.
- Never apply fertilizers in quantities exceeding the manufacturer's instructions. Instead, apply small amounts throughout the growing season.

Pesticides and Herbicides

- Pesticides should only be applied by licensed or certified applicators.
- Use alternatives to pesticides and herbicides, such as manual weed control, biological controls, and Integrated Pest Management strategies (learn more at: https://www.mass.gov/files/documents/2016/08/wk/ipm-kit-for-bldg-mgrs.pdf).
- Ensure that pesticide application equipment is capable of immediate shutoff in case of emergency.
- Never apply pesticides in quantities exceeding the manufacturer's instructions.
- Apply pesticides at the life stage when the pest is most vulnerable.
- Never apply pesticides if it is raining or immediately before expected rain.
- Establish setback distances from pavement, storm drains, and waterbodies, which act as buffers from pesticide application, with disease-resistant plants and minimal mowing.
- Do not apply pesticides within 100 feet of open waters or of drainage channels.

2.2.4 Pet Waste

Dog walking is not allowed on any UMass Chan Medical School campus. UMass Chan Medical School will continue to evaluate and review applicability of the MS4 Permit requirements related to pet waste.

2.2.5 Waterfowl Congregation

Congregation of waterfowl, including Canada Geese and others, can result in large nutrient loads to surrounding waterbodies due to the volume of fecal waste produced by the waterfowl. If waterfowl cannot be deterred, drainage from congregation areas is redirected away from drainage infrastructure and waterbodies. UMass Chan Medical School campus does not contain open water features, and therefore does not currently engage in waterfowl deterrent practices, but best practices for future consideration are listed below.

Best Practices to Discourage Waterfowl Congregation

- Instruct students and visitors not to feed waterfowl through signage or other public outreach methods and enforcement.
- Avoid mowing grass up to the edge of water to provide a natural vegetative buffer around a waterbody. This provides a small barrier for waterfowl to access the shoreline and provides a buffer where nutrient can be absorbed before reaching the waterbody.
- As necessary, conduct waterfowl deterrent practices such as reflective tape, strobe lights, addling eggs, harassment (human and/or dog), habitat manipulation, exclusionary fencing, and repelling devices.

2.2.6 Slope Erosion and Vegetative Cover

Ground disturbance and eroded slopes can result in moving soil, rock, or other material from up-slope areas into a waterbody, potentially transporting excess sediment, nutrients, and other contaminants. Controlling erosion by stabilizing disturbed areas and slopes can help maintain water quality.

Table 1 lists the responsible departments on each UMass Chan Medical School campus that conduct inspections for eroding areas during on-going operation and maintenance of open space.

Upon identification of eroding areas, measures are taken immediately to minimize erosion. These measures include installing energy dissipators, re-establishing vegetation, and installing temporary erosion controls, as needed. UMass Chan Medical School or its contractors install erosion controls during any ground disturbance within 250 feet of a water body or wetland resource or greater than 1-acre in size.

UMass Chan Medical School ensures all contractors comply with their National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Permit(s) for erosion control, as required. Following ground disturbance, the ground will be immediately stabilized with mulch or other practices and vegetation will be re-established as quickly as possible.

3 Buildings and Facilities

3.1 Overview and Inventory

This section covers UMass Chan Medical School's approach to maintaining its buildings and facilities. UMass Chan Medical School's MS4 Permit requires development of O&M procedures for buildings and facilities where pollutants are exposed to stormwater runoff. The UMass Chan Medical School-owned buildings and facilities that these procedures apply to are listed in **Table 2**.

The goal of these procedures is to minimize the potential for sites to generate pollutants that can runoff into the drainage system or nearby waterbodies. The following MS4 Permit requirements are addressed in this section:

- Develop an inventory of all permittee-owned buildings and facilities where pollutants are exposed to stormwater runoff, including administration buildings, laboratories, and parking garages;
- Evaluate the use, storage, and disposal of petroleum products and other potential stormwater pollutants and ensure employees or contractors responsible for handling products are trained;
- Ensure Spill Prevention Plans are in place, as applicable, and coordinate with the fire department as necessary;
- Develop management procedures for dumpsters and other waste management equipment; and
- Ensure parking lots are swept and areas surrounding facilities are kept clean to reduce runoff of pollutants.

Table 2 Inventory of Buildings and Facilities

Name	Building Type	Hazardous Material Storage (Y/N)	Hazardous Material Description (flammables, coerosives, toxics etc.)	Stormwater Pollution Prevention Plan (SWPPP) Required	Parking Lot (Y/N)
Power Plant	Power Plant	Y	Ignitable, toxic, corrosive	This facility is covered by a No Exposure Certification.	Y
Albert Sherman Center	Research Labs	Y	Ignitable, toxic, corrosive	N	Y
Employee “West” Parking Garage	Parking Garage	N		N	Y
Lazare Research Building	Research	Y	Ignitable, toxic, corrosive	N	Y
Benedict Building	Clinical	Y	Ignitable	N	N
Medical School Building	Education	Y	Ignitable, toxic, corrosive	N	Y
Hospital and Lakeside Emergency Wing	Hospital and Clinics	Y	Ignitable, toxic, corrosive	N	N
Shaw Building	Offices	N		N	Y
Ambulatory Care Center	Clinical	Y	Ignitable	N	N
Visitor “South” Parking Garage	Parking Garage	N		N	Y
Medical Office Building	Office	N		N	N
New Education Research Building (NERB)	Research	Y	Ignitable, toxic, corrosive	N	Y

3.2 O&M Procedures

UMass Chan Medical School values the maintenance and upkeep of buildings and facilities to ensure the comfort and safety of faculty, staff, students and visitors, while also preventing stormwater issues associated with these facilities and ensuring that these facilities perform at high levels. UMass Chan Medical School employees participate in training on buildings and facilities to ensure best practices and skills are kept up to date.

The O&M topics listed above are of particular concern under permit requirements.

3.2.1 Use, Storage and Disposal of Potential Pollutants

Potential pollutants stored at campus facilities include, but are not limited to, oil, gasoline, antifreeze, fertilizers, pesticides, and de-icing agents and additives. Minimizing or eliminating contact of materials containing potential pollutants with stormwater can significantly reduce pollution of receiving waters. Proper material handling and storage also contributes to employee health, an organized workplace, and efficient operations.

Spill prevention plans are put in place where applicable, based on inventories of material storage and potential pollutants. The attached Spill Prevention Control and Countermeasure (SPCC) Plan (Appendix A) applies to the facilities in **Table 2** where hazardous material occurs. The SPCC Plan has been reviewed with the Worcester Fire Department and UMass Chan Medical School meets regularly with the Fire Chief. Employees and contractors who are responsible for material use are trained on the SPCC plan and the guidelines below.

Best Practices for the Use, Storage, and Disposal of Potential Pollutants

- Follow manufacturer's guidance on proper storage, disposal, and use.
- Store chemicals under cover in an enclosed controlled, ventilated, well-lit, high and dry area that is cool and insulated to protect against temperature extremes. Ensure storage areas were constructed in accordance with local fire codes for storing flammable or combustible materials.
- Confine material storage indoors whenever possible. Plug or disconnect floor drains that lead to the stormwater system.
- Confine outdoor material storage to designated areas that are covered, on impervious surfaces, away from high traffic areas, and outside of drainage pathways.
- Equip storage areas with easily accessible spill cleanup materials and portable firefighting equipment. Emergency eyewash stations and emergency drench showers should be located near the storage area.
- Storage cabinets are locked with a weather proof sign that warns of the existence and danger of the materials inside visible at a distance of 25 feet, as appropriate.
- Include material safety data sheets (MSDS) in an accessible location(s).

- Keep materials in their original containers.
- If materials are not in their original containers, clearly label all storage containers with the name of the chemical, the expiration date, and handling instructions.
- Maintain an inventory of all raw and waste materials to identify leakage. Order new materials only when needed.
- Provide secondary containment for storage tanks and drums with sufficient volume to store 110 percent of the volume of the material.
- Inspect storage areas for spills or leaks and containment units for corrosion or other failures.
- Ensure that contaminated waste materials are kept in designated containers and stored in labeled, designated, covered, and contained areas.
- Dispose of excess or obsolete materials and associated waste materials in accordance with the manufacturer's specification and all applicable regulations.

3.2.2 Trash and Recyclables Management

All liquid and solid waste must be disposed of properly. Some of the most common sources of pollution at campus facilities are a result of littering, improper collection of debris, and improper disposal of waste. Staff and students can report trash container or dumpster issues by calling 508-856-3292 (Facilities Maintenance).

Best Practices for Waste Management

- Ensure a sufficient number of waste receptacles are in place, where appropriate. Additional receptacles will be placed in high traffic areas based on observation.
- All waste and recycling receptacles must be leak-tight with tight-fitting lids or covers.
- Keep lids on dumpsters and containers closed at all times unless adding or removing material. If using an open-top roll-off dumpster, cover it and tie it down with a tarp unless adding materials.
- Place waste or recycling receptacles indoors or under a roof or overhang whenever possible.
- Locate dumpsters on a flat, paved surface not over or adjacent to catch basins and install berms or curbs around the storage area to prevent run-on and run-off.
- Arrange for waste or recycling to be picked up regularly and disposed of at approved disposal facilities. Prior to transporting waste, trash, or recycling, ensure that containers are not leaking (double bag if needed) and properly secure containers to the vehicle.
- Never place hazardous materials, liquids, or liquid-containing wastes in a dumpster or recycling or trash container.
- Do not wash trash or recycling containers outdoors or in parking lots.
- Conduct periodic inspections and clean and sweep solid and liquid waste storage areas. Clean up any liquid leaks or spills with dry cleanup methods.

- In dumpster areas, regularly pick up surrounding trash and debris and regularly sweep the area

3.2.3 General Maintenance

The following best practices are applied when conducting general maintenance at UMass Chan Medical School owned facilities. These practices apply to all spaces facilities listed in **Tables 1 and 2**.

- When power washing buildings and facilities, ensure that the washwater does not flow into the storm system. Containment or filtering systems should be provided.
- When sanding, painting, power washing, etc., ensure that sites are properly prepared (e.g., use tarps) and cleaned (e.g., use dry cleaning methods) especially if they are near storm drains. Protect catch basins when maintenance work is conducted upgradient of them. Do not conduct when it is raining or prior to expected rain.
- When painting, use a drop cloth and clean up any spills immediately.
- Do not leave open containers on the ground where they may accidentally tip over.
- Buildings should be routinely inspected for areas of potential leaks.
- Do not discharge chlorinated water into the stormwater system. Water must be properly dechlorinated and tested before it is discharged.
- Streets and parking lots surrounding UMass Chan Medical School buildings and facilities should be swept and kept clean to reduce runoff of pollutants and debris to the stormwater system.

4 Vehicles and Equipment

4.1 Overview and Inventory

This section covers UMass Chan Medical School's approach to maintaining its vehicles and equipment. UMass Chan Medical School's MS4 permit requires establishment of procedures for the storage and maintenance of UMass Chan Medical School-owned vehicles and equipment, so as to minimize their contribution of pollution to waterbodies. This section addresses the following MS4 Permit requirements:

- Develop an inventory of permittee-owned vehicles and equipment;
- Establish procedures for the storage of vehicles.;
- Evaluate fueling areas owned or operated by the permittee; and
- Establish procedures to ensure vehicle wash waters are not discharged into the municipal storm sewer system or surface waters.

An inventory of these assets is included in **Table 3** below.

Table 3 Inventory of Vehicles and Equipment

Facility	Description	Vehicle and Equipment Type Stored
Loading Dock	Grounds equipment for facility maintenance	5 Kubota UTVs 2 street sweepers (and 1 scrubber) 1 front end loader 1 backhoe 1 skid steer 1 Holder snowblower 4 ride on lawnmowers
Loading Dock	Equipment for Receiving department	Trucks and vans
South Garage	Equipment for Parking and Police departments	Parking and police vehicles
Power Plant Parking Lot	Grounds equipment for facility maintenance	10 Grounds/Maintenance Trucks
Various Parking Lots	Equipment for miscellaneous departments, such as Animal Medicine	Vans, Cars and SUVs
Parking Garages	Parking for staff, students, and visitors.	Personal vehicles

4.2 O&M Procedures

UMass Chan Medical School strives to maintain its vehicles and equipment in good working order so as to provide high quality services and ensure the safety of faculty, staff, students, and visitors, all while preventing stormwater pollution from vehicles and equipment.

UMass Chan Medical School campus follows the following procedures for vehicles and equipment:

- Fleet and equipment are inspected at the time oil changes are completed, and managers ensure that leaking vehicles or equipment are not used.
- Vehicles with fluid leaks are stored indoors or containment is otherwise provided until repaired.
- Vehicles and equipment are fueled at the fuel tank outside of the power plant. Fueling areas include spill containment measures in order to minimize exposure.
- Vehicles and equipment are maintained and washed at the following locations: indoor loading dock, which includes containment and spill prevention measures.
- Materials used for maintaining and/or washing vehicles and equipment are used, stored, and disposed of in accordance with Section 3.2.1 Use, Storage and Disposal of Potential Pollutants.
- No wash water from vehicle and equipment maintenance areas is disposed of into the drainage system or allowed to flow overland off-site.

4.2.1 Vehicle and Equipment Maintenance

UMass Chan Medical School vehicles and equipment are inspected on a regular basis, and managers ensure that leaking vehicles or equipment are not used. Vehicles with fluid leaks are stored indoors or containment is otherwise provided until repaired. The following best practices are followed for vehicle and equipment storage, maintenance, and fueling.

Best Practices for Vehicle and Equipment Storage, Maintenance, and Fueling

Vehicle Storage

- Monitor vehicles and equipment for leaks and use drip pans as needed until repairs can be performed.
- When drip pans are used, avoid overtopping.
- Drain fluids from leaking or wrecked vehicles and parts as soon as possible. Dispose of fluids properly.
- Store and park vehicles on impervious surfaces and/or under cover or indoors whenever possible.

Vehicle Maintenance

- Conduct routine inspections of heavy equipment and vehicles to proactively identify maintenance needs or potential leaks.
- Perform routine preventive maintenance to ensure heavy equipment and vehicles are operating optimally.
- Recycle or dispose of waste properly and promptly.
- Sweep and pick up trash and debris as needed.
- Do not dump any liquids or other

materials outside, especially near or in storm drains or ditches.

Body Repair and Painting

- Conduct all body repair and painting work indoors.
- Minimize waste from paints and thinners. Calculate paint needs based on surface area.
- Use dry cleanup methods (vacuum, sweep) to clean up metal filings and dust and paint chips from grinding, shaving and sanding. Sweep debris from wet sanding after allowing it to dry overnight on the shop floor. Dispose of waste properly; never dump waste into storm or sanitary sewers.
- Use sanding tools equipped with vacuum capability to pick up debris and dust.
- Store all chemicals in accordance with Section 3.2.1 Use, Storage and Disposal of Potential Pollutants.

Fueling

- Fueling areas owned or operated by UMass Chan Medical School should be covered.
- Fueling areas should be evaluated to ensure that pollutants (e.g., gasoline or oil) do not enter the MS4.
- Follow procedures in Section 4.2.3 Fuel and Oil Handling.

4.2.2 Vehicle Washing Procedures

UMass Chan Medical School conducts vehicle washing at the indoor loading dock in designated wash areas. Outdoor washing of UMass Chan Medical School vehicles should be avoided unless wash water is contained in a tight tank or similar structure. Where no alternate wash system is available, and full containment of wash water cannot be achieved, the procedures in the following sections shall be followed.

Best Practices for Vehicle Washing

General

- Bring smaller vehicles to commercial washing stations.
- Where use of detergent cannot be avoided, use products that do not contain regulated contaminants. Use of a biodegradable, phosphate-free detergent is preferred.
- Maintain absorbent pads and drip pans to capture and collect spills or noticeable leaks observed during washing activities. Clean up any spills using the procedures described in the SPCC provided in Appendix A.
- Avoid discharge of any wash water directly to a surface water (e.g., stream, pond, drainage swale, etc.)
- Minimize use of water to the extent practical.
- Solids and particulate accumulation from the washing area shall be completed through periodic sweeping and/or cleaning.
- Designate separate areas for routine maintenance and vehicle cleaning. This helps prevent contamination of wash water by motor oils, hydraulic lubricants, greases, etc.
- Store all chemicals in accordance with Section 3.2.1 Use, Storage and Disposal of Potential Pollutants.

Outdoor Vehicle Washing

- Do not use solvents except in dedicated solvent parts washer systems or in areas not connected to a sanitary sewer.
- Do not power wash, steam clean or perform engine cleaning or undercarriage cleaning.
- Grassy and pervious (porous) surfaces may be used to promote direct infiltration of wash water, providing treatment before recharging groundwater and minimizing runoff to an adjacent stormwater system. Pervious surfaces or other infiltration-based systems shall not be used within wellhead protection areas or within other protected resources.
- Impervious surfaces discharging to engineered storm drain systems shall not discharge directly to a surface water unless treatment is provided. Treatment can include a compost-filled sock designed specifically for removal of petroleum and nutrients, such as the Filtrexx™ FilterSoxx product, or equal. The treatment device shall be positioned such that all drainage must flow through the device, preventing bypassing or short-circuiting.
- All adjacent engineered storm drain system catch basins shall have a sump. These structures shall be cleaned periodically.
- Heavily soiled vehicles or vehicles dirtied from salting or snow removal efforts shall not be washed outside, without exception.

Indoor Vehicle Washing Procedures

- Detergents shall not be used in areas where oil/water separators provide pre-treatment of drainage.
- Floor drains shall be connected to a sanitary sewer or tight tank. Floor drains discharging to adjacent surface water bodies or engineered storm drain systems shall be permanently plugged or otherwise abandoned before any vehicle wash activities are completed.
- Dry clean-up methods, such as sweeping and vacuuming, are recommended within garage facilities. Do not wash down floors and work areas with water.

Engine Washing and Steam Washing Procedures

- Do not wash parts outdoors.
- Maintain drip pans and smaller containers to contain motor oils, hydraulic lubricants, greases, etc. and to capture and collect spills or noticeable leaks observed during washing activities, to the extent practicable. Clean up any spills using the procedures described in the SPCC provided in Appendix A.
- Avoid cleaning with solvents except in dedicated solvent parts washer systems. Make use of pressure washing and steam cleaning.
- Recycle clean solutions and rinse water to the extent practicable.
- Wash water shall discharge to a tight tank or a sanitary sewer via an oil/water separator. Detergents shall not be used in areas where oil/water separators provide pre-treatment of drainage.

4.2.3 Fuel and Oil Handling

Spills, leaks, and overfilling can occur during handling of fuels and petroleum-based materials, representing a potential source of stormwater pollution, even in small volumes. This section provides guidance to UMass Chan Medical School staff on a variety of ways by which fuels and petroleum-based materials can be delivered, as well as steps to be taken when petroleum products (such as waste oil) are loaded onto vehicles for offsite disposal or recycling.

Best Practices for Fuel and Oil Handling

General

- There is no smoking while fuel handling is in process or underway. Sources of flame are kept away while fuel handling is being completed. This includes smoking, lighting matches, carrying any flame, or carrying a lighted cigar, pipe, or cigarette.
- The delivery or pickup truck driver should check in with the facility upon arrival.
- The facility representative should ensure that the appropriate spill cleanup and response equipment and personal protective equipment are readily available and easily accessible. Refer to the SPCC in Appendix A for examples of spill cleanup and response materials.
- The delivery vehicle's hand brake is set, and wheels are chocked while the activity is being completed.
- Catch basins and drain manholes are adequately protected.
- No tools are to be used that could damage fuel or oil containers or the delivery vehicle.
- No flammable liquid should be unloaded from any motor vehicle while the engine is operating, unless the engine of the motor vehicle is required to be used for the operation of a pump.
- Ensure that local traffic does not interfere with fuel transfer operations. If it does, make appropriate accommodations.
- The attending persons should watch for any leaks or spills. Any small leaks or spills should be immediately stopped, and spilled materials absorbed and disposed of properly. Follow the procedures in the SPCC in Appendix A.
- In the event of a large spill or one that discharges to surface waters or an engineered storm drain system, the facility representative should activate the facility's Stormwater Pollution Prevention Plan (SWPPP) and report the incident as specified in the document.

Delivery of Bulk Fuel

- The facility representative should check to ensure that the amount of delivery does not exceed the available capacity of the tank.
- A level gauge can be used to verify the level in the tank.
- If a level gauge is not functioning or is not present on the tank, the tank should be stick tested prior to filling.
- The truck driver and the facility representative should both remain with the vehicle during the delivery process.
- The truck driver and the facility

representative should inspect all visible lines, connections, and valves for leaks.

- When delivery is complete and the hoses are removed, buckets should be placed underneath connection points to catch drippings.
- The delivery vehicle should be inspected prior to departure to ensure that the hose is disconnected from the tank.
- The facility representative should inspect the fuel tank to verify that no leaks have occurred, or that any leaked or spilled material has been cleaned and disposed of properly.
- The facility representative should gauge tank levels to ensure that the proper amount of fuel is delivered and collect a receipt from the truck driver.

Delivery of Drummed Materials

- If damaged drums are found, they should be closely inspected for leaks or punctures.
- Breached drums should be removed to a dry, well-ventilated area and the contents transferred to other suitable containers.
- Drums should be disposed of in accordance with all applicable regulations.
- Drummed materials should not be unloaded outdoors during wet weather events.
- The truck driver and the facility representative should both remain with the vehicle during the delivery process.
- Drums should be handled and unloaded carefully to prevent damage.
- Upon completion of unloading, the facility representative should inspect the unloading point and the drums to verify that no leaks have occurred, that any leaked or spilled material has been cleaned up and disposed of properly, and that the unloaded drums are not leaking.
- The facility representative should check to ensure that the proper amount of fuel or other material is delivered and collect a receipt from the truck driver.

Removal of Waste Oil

- The truck driver and the facility representative should both remain with the vehicle during the tank draining process.
- When draining is complete and the hoses are removed, buckets should be placed underneath connection points to catch drippings.
- The facility representative should inspect the loading point and the tank to verify that no leaks have occurred, or that any leaked or spilled material has been cleaned up and disposed of properly.
- The facility representative should collect a receipt from the truck driver.
- When draining bulk oil tanks:
- The facility representative should verify that the volume of waste oil in the tank does not exceed the available capacity of the disposal hauler’s vehicle.
- The disposal hauler vehicle should be inspected prior to departure to ensure that the hose is disconnected from the tank.

5 Catch Basins

5.1 Overview and Inventory

This section covers UMass Chan Medical School's approach to maintaining its catch basins. Maintaining catch basins in good working order is an important best practice and MS4 Permit requirement. The Facilities Maintenance (Grounds) Department and their contractors oversee and perform routine inspections, cleaning, and maintenance of the approximately 173 catch basins that are located within the MS4 regulated area. UMass Chan Medical School regularly reviews catch basin inspection data from previous years and prioritizes cleaning of catch basins that were 50% full or more at last annual cleaning.

This section addresses the following MS4 Permit requirements:

- Establish a schedule with a goal that the frequency of routine cleaning will ensure that no catch basin at any time will be more than 50% full.
- Document in each annual report the following information:
    - Any action taken in response to excessive sediment or debris loadings
    - Total number of catch basins
    - Number of catch basins inspected
    - Number of catch basins cleaned
    - Total volume or mass of material removed from catch basins.

Catch basin locations are provided on the UMass Chan Medical School stormwater map at the following link: https://umms.maps.arcgis.com/apps/webappviewer/index.html?id=b5a254d1ec284323a9dfd837acec62fc

Additionally, the catch basin inspection tracking dashboard which displays the current status of the inspections is available at the following link:
https://vhb.maps.arcgis.com/apps/dashboards/5e06efc6af844621a5206a73b31035a3

5.2 O&M Procedures

UMass Chan Medical School will implement the following catch basin inspection and cleaning procedures to reduce the discharge of pollutants from the MS4:

- Catch basins will be cleaned such that they are no more than 50 percent full[2] at any time.
- If a catch basin sump is more than 50 percent full during two consecutive routine inspections or cleaning events, the finding will be documented, the contributing drainage area will be investigated for sources of excessive sediment loading, and to the extent practicable, contributing sources will be addressed. If no contributing sources are found, the inspection and cleaning frequency will be increased.
- Catch basins located near construction activities are inspected and cleaned more frequently if inspection and maintenance activities indicate excessive sediment or debris loadings (i.e., catch basins more than 50 percent full). Priority will also be given to catch basins that discharge to impaired waters.
- Properly dispose of collected sediments and catch basin cleanings (solid material, such as leaves, sand, and twigs removed from stormwater collection systems during cleaning operations).
- Cleanings from stormwater-only drainage systems may be disposed at any landfill that is permitted by MassDEP to accept solid waste. MassDEP does not routinely require stormwater-only catch basin cleanings to be tested before disposal, unless there is evidence that they have been contaminated by a spill or some other means.
- Screenings may need to be placed in a drying bed to allow water to evaporate before proper disposal. In this case, ensure that the screenings are managed properly to prevent pollution.
- Catch basin cleanings must be handled and disposed in accordance with compliance with the applicable MassDEP regulations, policies, and guidance (https://www.mass.gov/files/documents/2018/03/09/catch-basins.pdf).
- Collect data on the condition of the physical basin structure, its frame, and the grate, as well as on the quality of stormwater conveyed by the structure during inspections and cleanings.
- Make note of any potential pollutants or non-stormwater flows within the catch basin. Observations of oil sheen, discoloration, and/or trash and debris can indicate sources of pollution within the storm drain system. Observations of the following can indicate a potential connection of a sanitary sewer to the storm drain system: fecal matter, sewage odors, foaming (such as from detergent), optical enhancers (such as fluorescent dye added to laundry detergent).
- If any if signs of pollution and/or sanitary sewer connections are present, notify the Environmental Health & Safety Department.

[2] A catch basin sump is more than 50 percent full if the contents within the sump exceed one half the distance between the bottom interior of the catch basin to the invert of the deepest outlet of the catch basin

6 Streets and Parking Lots

6.1 Overview and Inventory

This section covers UMass Chan Medical School's approach to maintaining its streets and parking lots. As impervious surfaces, streets and parking lots can contribute to stormwater pollution. The following MS4 Permit requirements are covered in this section:

- Establish and implement procedures for sweeping and/or cleaning streets and permittee-owned parking lots.
- Document in each annual report the following information:
  - Number of miles cleaned, volume of material removed, or weight of material removed,
  - Street sweeping schedule to target areas with high pollutant loads.

UMass Chan Medical School owns and maintains the following roads and parking lots. Each of these properties is swept following the procedures outlined below.

- North Road
- South Road
- First Road
- Second Road
- Third Road
- Fifth Road
- Parking lots

6.2 O&M Procedures

All streets and UMass Chan Medical School-owned parking lots will be swept and/or cleaned a minimum of twice per year. More frequent sweeping is required for streets and parking lots in areas that discharge to certain nutrient-impaired waters, as indicated in UMass Chan Medical School's SWMP. Sweeping must be performed in these areas a minimum of two times per year, once in the spring (following winter activities such as sanding) and at least once in the fall (Sept 1 – Dec 1; following leaf fall).

Roadways without curbs or catch basins will be swept on an as needed basis based on inspection and community knowledge.

UMass Chan Medical School will store sweepings in an area outside of the 3rd level of the West garage in accordance with MS4 regulations. Once full, sweeping debris is disposed of off-site.

The UMass Chan Medical School will implement the following street and parking lot sweeping procedures to reduce the discharge of pollutants from the MS4:

Sweeping

- Street sweeping will be conducted in dry weather. Sweeping will not be conducted during or immediately after rain storms.
- Dry cleaning methods will used whenever possible, with the exception of very fine water spray for dust control. Avoid wet cleaning or flushing of the pavement.
- When necessary, parking bans will be enacted to facilitate sweeping on busy streets.
- Sweeping will be conducted in a manner that avoids depositing debris into storm drains.
- Sweeping equipment (mechanical, regenerative air, vacuum filter, tandem sweeping) will be selected depending on the level of debris. Brush alignment, sweeper speed, rotation rate, and sweeping pattern will be set to optimal levels to manage debris.
- Sweeping equipment will be routinely inspected and maintained to reduce the potential for leaks.

Disposal

- The reuse of sweepings is recommended by MassDEP. If street sweepings are reused (e.g., as anti-skid material or fill in parking lots), they will be properly filtered to remove solid waste, such as paper or trash, in accordance with their intended reuse. All reuse and/or disposal of street sweepings will be managed in accordance with current MassDEP policies and regulations. https://www.mass.gov/files/documents/2018/05/14/street-sweepings.pdf
- Sweepings intended for reuse can be stored for up to one year in approved temporary storage areas. Storage areas will be protected to prevent erosion and runoff and should be located away from wetland resource areas and buffer zones, surface water, or groundwater.
- Sweepings are classified as solid waste. If not reused, they will be disposed of at solid waste disposal sites.

7 Winter Road Maintenance

7.1 Overview

UMass Chan Medical School performs a variety of maintenance activities to ensure safe winter driving conditions on its roads and parking lots. This section addresses the following MS4 Permit requirements:

- Establish and implement procedures for winter road maintenance including
  - Use and storage of sand and salt
  - Minimize the use of sodium chloride and other salts
  - Evaluate opportunities for use of alternative materials
- Ensure snow disposal activities do not result in disposal of snow into waters of the United States.

7.2 O&M Procedures

UMass Chan Medical School understands that winter road operations can impact water quality. As a result, the UMass Chan Medical School will implement the following winter maintenance procedures to reduce the discharge of pollutants from the MS4:

- Minimize the use and optimize the application of sodium chloride and other salt[3] (while maintaining public safety) and consider opportunities for use of alternative materials.
- Optimize sand and/or chemical application rates through the use, where practicable, of automated application equipment (e.g., zero velocity spreaders), anti-icing and pre-wetting techniques, implementation of pavement management systems, and alternate chemicals. Maintain records of the application of sand, anti-icing and/or de-icing chemicals to document the reduction of chemicals to meet established goals.
- Prevent exposure of deicing product (salt, sand, or alternative products) storage piles to precipitation by enclosing or covering the storage piles. Implement good housekeeping, diversions, containment or other measures to minimize exposure resulting from adding to or removing materials from the pile. Store piles in such a manner as not to impact surface water resources, groundwater resources, recharge areas, and wells.
- UMass Chan Medical School uses road salt and sand as deicing materials for winter road maintenance (stored in covered salt shed adjacent to power plant), and Advance and Northern ice melt as deicing materials for winter sidewalk maintenance (stored on pallets in the loading lock of the medical school and Shaw buildings).
- The MS4 Permit prohibits snow disposal into waters of the United States. Snow disposal activities, including selection of appropriate snow disposal sites, will adhere to the Massachusetts Department of Environmental Protection Snow Disposal Guidance, Guideline No. BWR G2015-01

[3] For purposes of the MS4 Permit, salt means any chloride-containing material used to treat paved surfaces for deicing, including sodium chloride, calcium chloride, magnesium chloride, and brine solutions.

(Effective Date: December 21, 2015), located at:
http://www.mass.gov/eea/agencies/massdep/water/regulations/snow-disposal-guidance.html

Additional details on best practices are included in Appendix B.

8 Structural Stormwater BMPs

8.1 Overview and Inventory

Structural stormwater Best Management Practices (BMPs) are structural controls that are designed, built, and maintained to treat stormwater prior to being discharged to the drainage system or waterbody. BMPs often retain or infiltrate stormwater, allowing natural processes like settling, vegetation uptake, and filtration to remove pollutants from runoff. Examples include infiltration structures or swales, bioretention systems (e.g., rain gardens), wet ponds, detention basins, and infiltration/leaching basins or chambers.

An inventory of structural stormwater BMPs owned and/or maintained by UMass Chan Medical School is provided in **Table 4**. Campus-owned structural stormwater BMP locations are provided on the stormwater map at the following link:
https://umms.maps.arcgis.com/apps/webappviewer/index.html?id=b5a254d1ec284323a9dfd837acec62fc

Best practices for maintenance procedures are included below.

8.2 O&M Procedures

UMass Chan Medical School understands that in order to function properly and provide associated stormwater benefits, structural stormwater BMPs must be kept in good working order.

8.2.1 Inspections

Structural stormwater BMPs will be inspected annually at a minimum.

During inspections, the following BMP components will be reviewed for signs of potential issues, as listed below.

- **Inlet and Outlet Structures**
    - Blocked flow paths
    - Inlet is functioning as expected and flow from the contributing area is reaching the BMP
    - Outlet is performing as expected and flow is leaving the BMP appropriately
    - Structural damage
    - Vegetation is well established and there are no signs of erosion
    - Evaluate level of sedimentation and trash accumulation
- **BMP Treatment Areas**
    - Flow is dispersed evenly throughout the BMP
    - Erosion and rutting on the side slopes
    - Vegetation is well established, and invasive species are not present

- For infiltration-type BMPs, review to evaluate whether standing water exists 72 hours after a rain event
  - Identify any signs of illicit discharges or vandalism
  - Evaluate level of sedimentation and trash accumulation
- **Underground Components**
  - Evaluate level of sedimentation and trash accumulation
  - Structural damage
  - Access to components are not compromised
  - Inspect dry wells after every major storm for the first 3 months once construction is complete and annually thereafter

During inspection, UMass Chan Medical School will assign a level of service to each item reviewed. Areas where follow up maintenance is warranted will be indicated. The following maintenance activities will occur at structural BMPs based on condition determined during annual inspections:

- Repair structural damage
- Remove excess sediment, trash, and debris
- Re-establish vegetation
- Remove invasive vegetation
- Re-grade areas, as necessary to ensure proper flow patterns
- Stabilize eroded areas via vegetation establishment, placement of stone, or other energy dissipation measures

UMass Chan Medical School maintains records of annual inspections and maintenance actions performed for each structural BMP using Esri's ArcCollector mobile app.

8.2.2 Maintenance

Regular maintenance is important to prevent against premature failure of BMPs. The table on the following page outlines maintenance schedule in general and for specific BMP types.

Table 5 BMP Maintenance Schedule

Activity	Time of Year	Frequency
General		
Mow	Spring through Fall	As needed, Annually minimum
Remove dead or invasive vegetation	Fall and spring	Bi-annually
Prune	Spring or fall	Annually
If identified during inspections as needed		
Replace dead vegetation	Spring	As Needed
Stabilize eroded areas	Spring through Fall	As Needed
Re-grade areas to ensure proper flow patterns	Spring through Fall	As Needed
Remove excess sediment, trash, and debris	Spring through Fall	As Needed
Repair structural damage	Spring through Fall	As Needed
Bioretention Areas and Rain Gardens		
Mulch void areas	Spring	Annually
Replace all media and vegetation and repair structural damage as needed	Late spring/early summer	As needed
Extended Dry Detention Basin and Wet Basin		
Mow upper stage, side slopes, embankment and emergency spillway	Spring through Fall	Bi-annually
Remove sediment from basin	Year round	As required, at least once every 5 years
Remove sediment, trash and debris	Spring through Fall	Bi-annually (Minimum)
Dry Well		
Inspect dry wells	Spring through Fall	After every major storm for the first 3 months after construction completion. Annually thereafter
Infiltration Basin		

Activity	Time of Year	Frequency
Mow/rake buffer area, side slopes, and basin bottom	Spring and fall	Bi-annually
Remove trash, debris and organic matter	Spring and fall	Bi-annually

Appendix A: SPCC Plan

SPILL PREVENTION, CONTROL, AND COUNTERMEASURE PLAN
UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL
55 LAKE AVENUE NORTH
WORCESTER, MASSACHUSETTS

UMASS. University of Massachusetts Medical School

Prepared for:

University of Massachusetts Medical School
55 Lake Avenue North
Worcester, Massachusetts 01655

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October 5, 2018

GeoInsight Project 5948-046

SPCC RULE CROSS-REFERENCE

This cross-reference table lists each requirement in the Final SPCC Rule, provides a description of the requirement, and the location (page number) of the provision in this SPCC Plan.

Final SPCC Rule	Description of Section	Page
§ 112.1	Applicability, definitions, and general requirements.	1
§ 112.3	Requirements to prepare and implement a Spill Prevention, Control, and Countermeasure Plan by owners and operators.	1
§ 112.5	Amendments of a Spill Prevention, Control, and Countermeasure Plan.	3
§ 112.7(a)	General requirements.	1
§ 112.7(a)(1)	Cross reference table and facilities conformance with the requirements.	i
§ 112.7(a)(2)	Deviations from the requirements.	NA
§ 112.7(a)(3)	Physical layout of the facility.	4
§ 112.7(a)(3)(i)	Type of oil in each container and storage capacity.	4
§ 112.7(a)(3)(ii)	Discharge prevention measures.	11
§ 112.7(a)(3)(iii)	Discharge or drainage controls and procedures for control.	10
§ 112.7(a)(3)(iv)	Countermeasures for discharge, discovery, response, clean-up.	32
§ 112.7(a)(3)(v)	Methods of disposal of recovered materials.	36
§ 112.7(a)(3)(vi)	Contact list and phone numbers.	App. G
§ 112.7(a)(4)	Information and procedures to enable personnel to report a discharge.	38
§ 112.7(a)(5)	Describe procedures used when a discharge occurs.	32
§ 112.7(b)	Prediction of direction, rate, and total quantity of release that could be discharged.	11
§ 112.7(c)	Secondary containment.	11
§ 112.7(d)	Explanation of why secondary containment not practicable/Oil spill plan and written commitment.	NA
§ 112.7(e)	Inspections, tests, and records.	27, 46
§ 112.7(f)	Employee training and discharge prevention procedures.	24
§ 112.7(g)	Security (excluding oil production facilities).	23
§ 112.7(h)	Loading/unloading (excluding offshore facilities).	22
§ 112.7(i)	Brittle fracture evaluation requirements (field constructed tanks).	NA
§ 112.7(j)	Discussion of conformance with the requirements and other procedures listed in more stringent guidelines (including state requirements).	27, 32
§ 112.8(a); § 112.12(a)	General and specific requirements.	1
§ 112.8(b); § 112.12(b)	Facility drainage.	10
§ 112.8(c); § 112.12(c)	Bulk storage containers.	5
§ 112.8(d); § 112.12(d)	Facility transfer operations, pumping, and facility process.	22
§ 112.9	Requirements for onshore production facilities.	NA
§ 112.10	Requirements for onshore oil drilling and workover facilities.	NA
§ 112.11	Requirements for offshore oil drilling, production, or workover facilities.	NA

FACILITY IDENTIFICATION

Type of Facility:	University of Massachusetts Medical School (UMMS)
NAICS Code:	**541720**
Name and Address of Owner and	University of Massachusetts Medical School (UMMS)
Location of Plan:	55 Lake Avenue North Worcester, Massachusetts 01655
Latitude:	**42˚ 16' 37.8372**
Longitude:	**71˚ 45' 41.6772**

Designated Person Responsible for Spill Prevention (SPCC Coordinator):

Name: Jo-Ann Ranslow
Title: Environmental, Health, and Safety (EH&S) Manager/SPCC Coordinator

Secondary Person Responsible for SPCC Coordination:

Name: Matt Bosselait
Title: EH&S Specialist I

Persons Responsible for SPCC Coordination at Power Plant:

Name: Joe Collins
Title: Director of Energy Resources

Name: Bruce Hjort
Title: Assistant Director of Energy Resources

Total Qualifying Aboveground Storage: 467,361 gallons

Oil Spill History:

This Facility has not had a federal reportable release of oil.

MANAGEMENT APPROVAL

I have the authority to implement the Spill Prevention, Control, and Countermeasure (SPCC) Plan, dated October 2018; certify that we have the necessary personnel and equipment resources, owned or operated by the Facility, to respond to a discharge within appropriate response times; and have a written contractual agreement with an oil spill removal organization that identifies and ensures the availability of the necessary personnel and equipment within appropriate response times.

Signature Charleen Sotolongo Date 11 / 16 /2018

Name: Charleen Sotolongo
(Printed)

Title: Sr. Director Environmental, Health, and Safety and Radiation Safety

ENGINEER CERTIFICATION

I hereby certify that I have examined the Facility, either firsthand or through my authorized representative, and being familiar with the provisions of 40 CFR Part 112, as amended, attest that this SPCC Plan has been prepared in accordance with good engineering practice, including consideration of applicable industry standards, and with the requirements of 40 CFR Part 112; procedures for required inspections and training have been established; and the plan is adequate for the Facility. This certification is void unless this SPCC Plan has been endorsed and implemented by the management of the named facility.

Certification of this SPCC Plan by a registered Professional Engineer will not in any manner relieve University of Massachusetts Medical School of its responsibility to fully implement and abide by the SPCC Plan. This SPCC Plan was written under the assumption that existing site controls are maintained and that proper operating practices will be implemented to perform and function in accordance with their designated purposes regarding the intent of this SPCC Plan.

____________________________________ Date: 10/5/2018

Signature, Registered Professional Engineer

Susanne L. Pisano, P.E.
Registered Professional Engineer

Registration No. 42455 State: MA

CERTIFICATION OF THE APPLICABILITY OF SUBSTANTIAL HARM CRITERIA CHECKLIST

Facility Name: University of Massachusetts Medical School (UMMS)
Facility Address: 55 Lake Avenue North, Worcester, Massachusetts 01655

1. Does the facility transfer oil over water to or from vessels and does the facility have a total oil storage capacity greater than or equal to 42,000 gallons?
   Yes: ______ No: __X__

2. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and does the facility lack secondary containment that is sufficiently large to contain the capacity of the largest aboveground oil storage tank plus sufficient freeboard to allow for precipitation within any aboveground oil storage tank area?
   Yes: ______ No: __X__

3. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance (as calculated using the formula in Attachment C iii, Appendix C, 40 CFR Part 112 or a compatible formula) such that a discharge from the facility could cause injury to fish and wildlife and sensitive environments? For a further description of fish and wildlife sensitive environments, see Appendix I, II, and III to DOC/NOAA's "Guidance for Facility and Vessel Response Environments" (Section 10, Appendix E, 40 CFR Part 112 for availability) and the applicable Area Contingency Plan.
   Yes: ______ No: __X__

4. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance (as calculated using the appropriate formula in Attachment C iii, Appendix C, 40 CFR Part 112 or a comparable formula) such that a discharge from the facility would shut down a public drinking water intake?
   Yes: ______ No: __X__

5. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and has the facility experienced a reportable oil spill in an amount greater than 10,000 gallons in the last 5 years?
   Yes: ______ No: __X___

SUBSTANTIAL HARM CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and that based upon my inquiry of those individuals responsible for obtaining this information, I believe that the submitted information is true, accurate, and complete.

Name: Jo-Ann Ranslow

Signature: JoAnn Ranslow

Title: Environmental, Health, and Safety Manager

Date: 11 / 16 /2018

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Control Copies

Copy 1: Environmental, Health, and Safety (EH&S) Department

Copy 2: Facilities/Engineering Department

Copy 3: Power Plant

Copy 4: EH&S Website (electronic copy)

SPILL PREVENTION, CONTROL, AND COUNTERMEASURE PLAN
UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL
55 LAKE AVENUE NORTH
WORCESTER, MASSACHUSETTS

1.0 INTRODUCTION

The United States Environmental Protection Agency (USEPA) Regulation Title 40 Code of Federal Regulations (CFR) Part 112 (40 CFR Part 112) requires that a Spill Prevention, Control, and Countermeasure (SPCC) Plan be prepared for a non-transportation related facility that could reasonably be expected to discharge oil into or upon a navigable body of water of the United States or adjoining shorelines and has one or more of the following:

- a total capacity of 1,320 gallons or greater within multiple aboveground storage tank(s) (ASTs); and/or

- a total capacity of 42,000 gallons or greater within underground storage tank(s) (USTs).

This SPCC Plan was prepared for University of Massachusetts Medical School (UMMS) located at 55 Lake Avenue North, Worcester, Massachusetts (the Facility). An SPCC Plan is required for UMMS because more than 1,320 gallons of oil are stored aboveground at the Facility in containers whose capacity is equal to or greater than 55 gallons.

A Facility Response Plan (FRP) is an oil pollution prevention plan that is combined with the SPCC Plan for facilities that “could cause substantial harm to the environment.” As certified by the SPCC Coordinator (Page vi of this SPCC Plan), the Facility does not exceed the criteria requiring an FRP.

The intent of an SPCC Plan is to establish the procedures and equipment required to prevent a discharge of petroleum products in quantities that violate applicable water quality standards, cause a sheen upon or discoloration of the surface of navigable waters or adjoining shorelines, or cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines. The SPCC Plan also establishes the activities required to mitigate such discharges should they occur. Hazardous material spills, with the exception of waste oil, are not covered under this SPCC Plan.

This SPCC Plan was prepared for the Facility in general accordance with 40 CFR Part 112. A copy of the current 40 CFR Part 112 regulation is presented in Appendix A. A complete copy of the SPCC Plan shall be maintained in the SPCC Coordinator’s Office and will be made available to the USEPA Regional Administrator and his/her agents, upon request, for on-site review during normal working hours.

Facility personnel with responsibilities related to the storage and management of oil shall become familiar with the contents of the SPCC Plan. The SPCC Coordinator shall be responsible for implementation of emergency spill response activities. In addition, a second full-time employee shall be trained to assume the SPCC Coordinator's responsibilities in the Coordinator's absence.

2.0 PLAN REVIEW AND RECORD OF AMENDMENTS

The SPCC Plan will be reviewed and certified by a Licensed Professional Engineer at least once every five years and will be amended within six months if such review indicates that alternative control and prevention technologies or management techniques will significantly reduce the likelihood of a spill or release of oil from the Facility. In addition, this SPCC Plan shall be reviewed and/or amended, whenever:

- there is a significant change in the design, construction, operations, or maintenance of the Facility that materially affects the Facility's potential for the discharge of oil;
- the responsible persons or coordinators change; or
- the emergency equipment changes.

This SPCC Plan must be re-certified whenever there is a significant change in Facility design, construction, operation, or maintenance that affects the Facility’s potential for the discharge of oil to navigable waters.

3.0 FACILITY INFORMATION

3.1 FACILITY LOCATION AND DETAILS

The Facility consists of buildings of varying size representing: approximately 3.5 million square feet of classroom, laboratory, research, office, hospital, and support space; paved parking and access roads; and landscaped areas. The Facility includes the UMMS and University of Massachusetts Memorial Medical Center (UMMMC) buildings (including the Albert Sherman Center, the Ambulatory Care Center, the Lakeside Addition, the Benedict Building, the Lazare Research Building [LRB], the Shaw Building, Biotech 1, and Biotech 2), the Power Plant, a vehicle fueling area, the heliport facility (including the garage and landing pad area for the Life Flight Air Ambulance service), and three parking garages. There are two high-rise buildings, which house research laboratories, offices, and classrooms.

See Figure 1 for a Property Locus and supporting figures showing the location of oil storage at the Facility.

3.2 FACILITY OPERATIONS AND DESCRIPTION OF OIL STORAGE

UMMS serves as the Commonwealth's only public medical school and is engaged in providing graduate medical education and biomedical research. It consists of three graduate schools: The School of Medicine; The Graduate School of Biomedical Sciences; and The Graduate School of Nursing. The campus also includes the UMMMC, which is a 370-bed, acute care facility. Additionally, the UMMMC serves as a Level I Trauma Center to the region and the home base of the emergency medical helicopter service Life Flight.

The following is a list of materials stored at the Facility that are regulated under the provisions of 40 CFR Part 112:

- diesel;
- jet A aviation fuel;
- no. 2 fuel oil;
- no. 6 fuel oil;
- gasoline;
- hydraulic and lubricating oil;
- type K oil;
- waste oil;
- silicone transformer fluid;
- elevator hydraulic fluid; and
- cooking oil/waste cooking oil.

An inventory of tanks, containers, and oil-containing equipment, as well as their contents and capacities, is provided in Section 3.2.1. Containment is described in Sections 3.5 and Section 3.6.

The ASTs and associated piping and equipment at the Facility are compatible with their respective contents in the manner in which they are stored. Specific information related to qualifying bulk storage containers at the Facility, including oil capacity, construction type, containment, and other details, is included in Table 1, Section 3.5.

3.2.1 Qualifying Bulk Storage Containers

Bulk storage containers include ASTs and containers (i.e., drums, carboys, etc.) that are used to store oil and are not classified as oil-filled equipment (see Section 3.2.2). The bulk storage containers that must be included in the SPCC Plan oil storage volume calculation, provided with secondary containment (or environmental equivalent), and tested/inspected in accordance with industry standards are those that have a volume of 55 gallons or greater (i.e., "qualifying bulk oil storage containers"). The Facility has qualifying bulk oil storage containers associated with cooking, heating, power generation, equipment maintenance, and helicopter fueling and maintenance. The qualifying bulk oil storage containers at the Facility include the following.

- <u>Tank 1</u>:

  Tank 1 is a 9,600-gallon diesel AST associated with the hospital emergency generator. It is located near the helipad area, along Lake Avenue North on the eastern side of the Facility (see Figure S-02). The AST is a double-walled steel tank and is located immediately adjacent to the emergency generator enclosure. Tank 1 is connected to Tank 2 (see below) via overhead piping. Tank 1 is located in a paved area immediately east of, and approximately 10 feet below the elevation of the helicopter landing pad.

- <u>Tank 2</u>:

  Tank 2 is a 3,000-gallon diesel AST associated with the hospital emergency generator, located near the helipad area (see Figure S-02). The AST is a double-walled steel base tank located directly beneath the hospital emergency generator and associated generator enclosure. It operates as a day tank (belly tank). Tank 2 is located in a paved area immediately east of, and approximately 10 feet below the elevation of the helicopter landing pad.

- <u>Tank 3</u>:

  Tank 3 is a 6,000-gallon AST containing Jet A aviation fuel for the Life Flight Air Ambulance helicopter, located at the helipad area (see Figure S-02). The AST is a double-walled concrete construction. It is connected to a fueling pump, hose reel, and filter assembly for fueling the helicopters via single-walled steel piping. The AST is located in the same paved area as Tank 1 and Tank 2, although the fueling pump, hose reel, and filter assembly are located along the edge of the helicopter landing pad, approximately 4 to 5 feet above the top elevation of the tank.

- Tanks 4, 5, 6, 7, and 8:

  Five 84,000-gallon steel ASTs, each measuring approximately 12 feet in diameter and 100 feet long, store fuel oil used by the Power Plant to generate heat and electricity. Four of these tanks, which are located on Level B of the Power Plant (see Figure P-1), store No. 6 fuel oil and one tank stores No. 2 fuel oil. The ASTs are contained within an underground concrete oil crypt, which acts as secondary containment. Each single-walled steel tank is anchored and supported on concrete saddles, permitting complete visual inspection of the tanks. The tanks are individually piped and filled, and interconnection of the tanks is not possible. Piping from the tanks to the Power Plant is contained in an underground utility tunnel.

- Tank 9:

  Tank 9 is a compartmentalized AST that stores 4,000 gallons of diesel and 2,000 gallons of gasoline (6,000 gallons of product total). The AST is located at the northwest corner of the Power Plant building (see Figure P-3) and is used to fuel ambulances and maintenance vehicles. The AST is a welded steel tank with 0.25-inch thick Styrofoam (foam) insulation and an impervious barrier of 30-Mil high-density polyethylene membrane (HDPE). The AST is equipped with a computerized fuel dispensing and management system that was installed in 1998.

- Tank 10:

  Tank 10 is a 100-gallon day tank storing diesel associated with the Power Plant emergency generator (see Figure P-3). The diesel is piped from Tank 9 into Tank 10 via overhead piping.

- Tank 11:

  Tank 11 is a 3,000-gallon single-walled AST located on Level A of the Ambulatory Care Center (see Figure X-H1.01). The AST stores diesel fuel for use with the Ambulatory Care Center emergency generator. The floor of the room in which Tank 11 is located is recessed approximately 1 foot and does not contain a floor drain. There is also a 50-gallon day tank located on Level 8 and associated with the Ambulatory Care Center emergency generator; however, this day tank is below the 55-gallon storage threshold.

- Drums 1 through 21:

  There are 21, 55-gallon drums of oil stored on the first floor of the Power Plant (see Figure P-2), including waste oil, turbine fluid, and synthetic lubricant. Most of the drums are stored on secondary containment pallets.

- Drums 22 and 23:

  There are two, 55-gallon drums of waste cooking oil stored at the Albert Sherman Center in Room AS1-2020 (see Figure L-1.0.01). This oil is picked up twice per month for use as biodiesel.

Also refer to Table 1 in Section 3.5 for a summary of the bulk storage containers described above.

3.2.2 Oil-Filled Operational Equipment

Oil-filled equipment includes oil storage containers in which the oil is present solely to support the function of the apparatus or the device. The oil-filled equipment container is not considered a bulk storage container, as outlined in Section 3.2.1. In lieu of providing secondary containment, the Facility may list the equipment in the SPCC Plan and provide a written commitment of manpower, equipment, and materials to quickly control and remove discharged oil. As a best management practice, the oil-filled equipment is included in the inspection program (see Section 5.1). The oil-filled equipment at the Facility includes:

- oil-filled electrical transformers: 19 oil-filled electrical transformers; and

- operating equipment: a Life Flight Air Ambulance helicopter, various pieces of Power Plant equipment, and 12 elevators containing hydraulic fluid.

A description of the oil-filled equipment is presented in Sections 3.2.2.1 and 3.2.2.2.

3.2.2.1 Electrical Transformers

There are a total of 25 electrical transformers located throughout the Facility. The following 19 of the 21 transformers are of the wet type (See Figures X-H1.01 through X-E2.81).

- Outdoor Transformers 1 and 2: There are two transformers, one containing 1,376 gallons of silicone fluid and one containing 1,294 gallons of silicone fluid, located outdoors adjacent to the Power Plant (see Figure P-2).

- Transformers TSI-001 and TSI-002: There are two transformers, one containing 320 gallons of silicone fluid and one containing 230 gallons of silicone fluid, located in the area designated Clinical 1 on School Level A (see Figure S-2).

- Transformers TSI-005 and TSI-006: There are two transformers, each containing 320 gallons of silicone fluid, located in the area designated Basic #1 on School Level A (see Figure S-2).

- Transformers TSI-007 and TSI-008: There are two transformers, each containing 380 gallons of silicone fluid, located in the area designated Student Lab 2 on School Level 8 (see Figure S-3).

- Transformers TSI-009 and TSI-010: There are two transformers, each containing 380 gallons of silicone fluid, located in the area designated Basic #2 on School Level 8 (see Figure S-3).

- Transformers TSI-011 and TSI-012: There are two transformers, each containing 380 gallons of silicone fluid, located in the area designated Clinical 2 on School Level 8 (see Figure S-3).

- Transformer TSI-013: There is one transformer containing 360 gallons of silicone fluid, located in the area designated Sub SS-4 on Hospital Level 9 (see Figure H-2).

- Transformers TSI-014 and TSI-019: There are two transformers, one containing 325 gallons of silicone fluid and one containing 360 gallons of silicone fluid, located in the area designated Sub SS-3 on Hospital Level 9 (see Figure H-2).

- Transformer TSI-015: There is one transformer containing 360 gallons of silicone fluid, located in the area designated Sub SS-2 on Hospital Level 9 (see Figure H-2).

- Transformers TSI-016 and TSI-017: There are two transformers, each containing 360 gallons of silicone fluid, located in the area designated Sub SS-1 on Hospital Level 9 (see Figure H-2).

- Transformer TSI-018: There is one transformer containing 180 gallons of silicone fluid, located in the area designated Sub SS-5 on Hospital Level 9 (see Figure H-2).

- Ambulatory Care Center Transformers 1 and 2: There are two transformers, each containing 389 gallons of silicone fluid, located in the Ambulatory Care Center. One transformer is located on Level A and one transformer is located on Level 8 (see Figures X-E2.04 and X-E2.81).

The two outdoor transformers (Outdoor Transformers 1 and 2) are situated over gravel-filled concrete containment berms, each measuring approximately 14.5 feet wide by 24 feet long by 3 feet high. The transformers located on Level A and Level 8 of the school building are set on concrete pads, and are located in secured, bermed rooms. The transformers on Level 9 of the Hospital building are surrounded by concrete containment berms that are approximately 4 inches high. The transformers located at the Ambulatory Care Center are surrounded by steel berms that are approximately 2 feet high. Typically, if a transformer must be replaced, it is replaced with a dry-type transformer.

The USEPA recognizes that secondary containment around transformers may present an unreasonable safety risk (FR 54621 - Oct. 22, 1991). If it is not practicable for a secondary containment system to be installed, the regulations allow for another type of containment system or a strong oil spill contingency plan following the provisions of 40 CFR 109 to be in place in lieu of the containment system. The transformers at the Facility are equipped with secondary containment, are inspected by Facility maintenance staff, and are provided with active containment measures (i.e., spill response materials).

3.2.2.2 Operating Equipment

Oil-filled operational equipment at the Facility includes the Life Flight Air Ambulance helicopter, which is located at the heliport garage, various Power Plant equipment, and 20 elevators containing hydraulic fluid, as follows.

- Life Flight Air Ambulance helicopter: The helicopter is housed within the heliport garage at the heliport area and has a fuel tank capacity of 187 gallons (see Figure S-02).

- Generators G1 and G2: Generator G1 and Generator G2 are located on the first floor of the Power Plant (see Figure P-2). Each generator has a capacity of 300 gallons of oil.

- Generators G1 and G2 Hydraulic skid: The Generator G1 and Generator G2 hydraulic skids are located on the first floor of the Power Plant (see Figure P-2). Each hydraulic skid holds 60 gallons of hydraulic fluid.

- Generator G3: Generator G3 is located on the first floor of the Power Plant (see Figure P-2) and has a capacity of 650 gallons of oil.

- Chiller 4 Murray Turbine: Chiller 4 Murray Turbine is located on the first floor of the Power Plant (see Figure P-2) and has a capacity of 75 gallons of oil.

- Chiller 5 York Compressor: Chiller 5 York Compressor is located on the first floor of the Power Plant (see Figure P-2) and has a capacity of 55 gallons of oil.

- Solar CTG: The Solar CTG is located on the first floor of the Power Plant (see Figure P-2) and has a capacity of 739 gallons of oil.

- Enerflex gas compressor: The Enerflex gas compressor is located in the gas compressor room on the first floor of the Power Plant (see Figure P-2). The compressor has a capacity of 135 gallons of oil.

- Elevators: The Facility has 20 elevators with hydraulic reservoirs. The elevators are located throughout the Facility including at the Med School, South Garage, Teaching Hospital, Benedict Building, Power Plant, Albert Sherman Center, and the 5 Biotech buildings.

The elevators are checked regularly by elevator maintenance contractors.

3.2.3 Non-Qualifying Containers

Non-qualifying containers are oil-storage containers that have a capacity of less than 55 gallons, but still have a potential for a release to the environment. The non-qualifying containers at the Facility include:

- 5-gallon buckets of hydraulic oil located throughout the Power Plant;
- waste oil containers, including a 30-gallon drum in the maintenance vehicle parking garage near the Power Plant;
- cooking oil containers in school and hospital kitchens (35 pounds/approximately 4.5 gallons each; containers of virgin cooking oil do not exceed 55 gallons);
- approximately ten UMMS-owned motor vehicles (fuel tank capacity of approximately 20 gallons each);
- the Chiller 4 York Compressor located on the main floor of the Power Plant (capacity of 50 gallons);
- a 50-gallon diesel day tank associated with the Ambulatory Care Center emergency generator; and
- three trash compactors with hydraulic tanks having capacities of approximately 40 gallons of hydraulic fluid each, as follows:
  - Trash Compactor 1 in Garage;
  - Trash Compactor 2 in Garage; and
  - Trash Compactor at LRB.

According to 40 CFR 112, oil stored in non-qualifying containers does not get counted towards the Facility-wide oil storage volume, does not have to be provided with secondary containment, and does not have to be tested/inspected. Refer to Table 2 in Section 3.5 for a summary of the non-qualifying containers.

3.3 SURFACE DRAINAGE

The Facility property is generally flat. Surface water runoff from snow melt and during storms discharges via overland flow and from catch basins to Lake Quinsigamond, which is located approximately 500 feet east of the heliport. Catch basins are located throughout the property (see Figure 22), with those nearest to the lake located approximately 500 feet west of the lake along Lake Avenue North, downgradient from Tanks 1 and 2. Water that does not enter the catch basins either infiltrates unpaved areas or evaporates.

3.4 STORM WATER MANAGEMENT

The Facility has an underground drainage system and operates two 6,000-gallon oil/water separators, which flow to the Upper Blackstone Water Pollution Abatement District sanitary sewer system. One oil/water separator is located at the entrance to the Power Plant and the other is located near the heliport. Storm water runoff from outside the Power Plant and heliport flow through the oil/water separators prior to leaving the UMMS property. Catch basins located throughout other areas of the property (see Figure 20) convey storm water runoff from the paved parking areas and roadway to outfalls that discharge to Lake Quinsigamond.

3.5 OIL SPREAD DISTANCE CALCULATIONS

An analysis of the potential spill spread (i.e., spill radius) and discharge velocity/flow rate from the qualifying bulk storage containers at the Facility is presented in Appendix B. Spill spread and discharge velocity were analyzed for Tanks 1 through 11, Containers 1 through 23, and Outdoor Transformers 1 and 2.

The results of these calculations are presented in Table 1. As required by 40 CFR Part 112, the spill spread and flow rate evaluations were completed assuming that the Facility does not have secondary containment devices.

TABLE 1
TANK INVENTORY, SPILL SCENARIOS, AND CONTAINMENT MEASURES

Vessel (Location)	Storage Volume (gallons)	Maximum Quantity Potentially Spilled (gallons)	Product	Surface Type (oil thickness at zero flow)	Height of Tank (m)	Flow Rate (gal/min)	Spill Radius (ft)	Spill Scenario	Containment Measures
Qualifying Containers									
Tank 1 Heliport (for Emergency Generator)	9,600	9,600	Diesel	Impervious (0.02 feet zero-flow)	5.51	423	198	Tank 1 is a double-walled steel tank located immediately adjacent to the generator enclosure. In the absence of secondary containment, a release from the tank would flow onto the paved area beneath and around the tank. Oil would then flow down the grass-covered slope immediately east of the tank, towards a catch basin located at the edge of the roadway, approximately 100 feet away. The catch basin empties into a storm drain, which flows directly into Lake Quinsigamond. If oil migrated towards the drain located in the paved parking area (approximately 100 feet north of the tank), it would flow into a 6,000-gallon oil/water separator located near the heliport. Water from the oil/water separator flows to the Upper Blackstone Water Pollution Abatement District sanitary sewer system, and oil would remain in the separator until removed/cleaned up by a spill contractor. This scenario is less likely due to the grading of the area.	• Double-walled tank • Periodic visual inspections • Spill equipment in readily accessible locations
Tank 2 Heliport (for Emergency Generator)	3,000	3,000	Diesel	Impervious (0.02 feet zero-flow)	2.00	255	111	Tanks 2 is a double-walled steel base tank located directly beneath an emergency generator and associated generator enclosure. In the absence of secondary containment, a release from the tank would flow onto the paved area beneath and around the tank. Oil would then flow down the grass-covered slope immediately east of the tank, towards a catch basin located at the edge of the roadway, approximately 100 feet away. The catch basin empties into a storm drain, which flows directly into Lake Quinsigamond. If oil migrated towards the drain located in the paved parking area (approximately 100 feet north of the tank), it would flow into the 6,000-gallon oil/water separator located near the heliport. Water from the oil/water separator flows to the Upper Blackstone Water Pollution Abatement District sanitary sewer system, and oil would remain in the separator until removed/cleaned up by a spill contractor. This scenario is less likely due to the grading of the area.	• Double-walled tank • Periodic visual inspections • Spill equipment in readily accessible locations
Tank 3 (Heliport)	6,000	6,000	Jet A Aviation Fuel	Impervious (0.02 feet zero-flow)	8.99	540	157	Tank 3 is a double-walled concrete construction. A release from the tank would be contained in the outer concrete shell. If the secondary containment fails, oil would flow down the slightly graded, paved surface of the parking lot towards a drain located approximately forty feet away. The drain empties into a 6,000-gallon oil/water separator located near the heliport. Water from the oil/water separator flows to the Upper Blackstone Water Pollution Abatement District sanitary sewer system, and oil would remain in the separator until removed/cleaned up by a spill contractor.	• Double-wall secondary containment structure (6,600 gallon) • Periodic visual inspections • Spill equipment in readily accessible locations
Tank 4 (Power Plant)	84,000	84,000	No. 2 Fuel Oil	Impervious (0.02 feet zero-flow)	12.01	624	586	A release from the tanks would be contained in the concrete crypt. If the released liquid breached the crypt, it would be contained in the basement of the Power Plant.	• Concrete containment vault (> 84,000 gallon) • Daily visual inspections • Spill equipment in readily accessible locations
Tank 5 (Power Plant)	84,000	84,000	No. 6. Fuel Oil	Impervious (0.02 feet zero-flow)	12.01	624	586		

TABLE 1
TANK INVENTORY, SPILL SCENARIOS, AND CONTAINMENT MEASURES

Vessel (Location)	Storage Volume (gallons)	Maximum Quantity Potentially Spilled (gallons)	Product	Surface Type (oil thickness at zero flow)	Height of Tank (m)	Flow Rate (gal/min)	Spill Radius (ft)	Spill Scenario	Containment Measures
Qualifying Containers									
Tank 6 (Power Plant)	84,000	84,000	No. 6. Fuel Oil	Impervious (0.02 feet zero-flow)	12.01	624	586		
Tank 7 (Power Plant)	84,000	84,000	No. 6. Fuel Oil	Impervious (0.02 feet zero-flow)	12.01	624	586		
Tank 8 (Power Plant)	84,000	84,000	No. 6. Fuel Oil	Impervious (0.02 feet zero-flow)	12.01	624	586		
Tank 9 (Diesel) (Vehicle Fueling Area)	4,000	4,000	Diesel	Impervious (0.02 feet zero-flow)	8.76	533	128	The tank is a compartmentalized tank that is situated within a lined concrete containment shell. A release from either compartment of the tank would be contained in the lined shell. In the unlikely event that the secondary containment fails, oil would flow into a 6,000-gallon oil/water separator located near the entrance to the Power Plant through a drain immediately adjacent to the tank. Water from the oil/water separator flows to the Upper Blackstone Water Pollution Abatement District sanitary sewer system, and oil would remain in the separator until removed/cleaned up by a spill contractor.	• Double-wall secondary containment structure (7,000 gallon) • Periodic visual inspections • Spill equipment in readily accessible locations
Tank 9 (Gasoline) (Vehicle Fueling Area)	2,000	2,000	Gasoline	Impervious (0.02 feet zero-flow)	8.76	533	90		
Tank 10 (Vehicle Fueling Area)	100	100	Diesel	Impervious (0.02 feet zero-flow)	2.00	255	20	The day tank is located inside the Power Plant emergency generator's enclosure. A release from the tank's secondary containment would be contained within this enclosure. In the unlikely event that the oil escaped this enclosure, it would flow into a 6,000-gallon oil/water separator located near the entrance to the Power Plant through a drain immediately adjacent to the tank. Water from the oil/water separator flows to the Upper Blackstone Water Pollution Abatement District sanitary sewer system, and oil would remain in the separator until removed/cleaned up by a spill contractor.	• Double-walled tank located within the enclosure housing the Power Plant emergency generator • Periodic visual inspections • Spill equipment in readily accessible locations
Tank 11 (Ambulatory Care Center)	3,000	3,000	Diesel	Impervious (0.02 feet zero-flow)	4.00	360	111	This tank is contained in a room that does not contain a floor drain. The floor of the room is recessed approximately one foot. A release of oil from this tank would be contained in this room until a contractor could clean the spilled material.	• Contained in liquid-tight, bermed room • Periodic visual inspections • Spill equipment in readily accessible locations
Drum Storage 1 – 21 (Albert Sherman Center in Room AS1-2020)	55	110	Waste Cooking Oil	Impervious (0.02 feet zero-flow)	2.99	311	21	A release from a drum would flow onto the concrete floor. The drums are not located on a secondary containment; therefore, a release may flow into the concrete compactor storage area that is pitched toward the building.	• Spill equipment in readily accessible locations • Secondary containment should be added to the drum storage area (see Section 9.1)
Drum Storage 22 – 23 (Bunker)	55	1,155	Waste Oil	Impervious (0.02 feet zero-flow)	2.99	311	69	A release from a drum would flow onto the concrete floor. It is possible that the oil could enter a floor drain, some of which are located within several feet from drum storage. Oil entering a floor drain would enter the sanitary sewer system, which leads to the Upper Blackstone Water Pollution Abatement District.	• Most floor drains are collared • Most drums are stored on containment pallets • Spill equipment in readily accessible locations

TABLE 1
TANK INVENTORY, SPILL SCENARIOS, AND CONTAINMENT MEASURES

Vessel (Location)	Storage Volume (gallons)	Maximum Quantity Potentially Spilled (gallons)	Product	Surface Type (oil thickness at zero flow)	Height of Tank (m)	Flow Rate (gal/min)	Spill Radius (ft)	Spill Scenario	Containment Measures
Qualifying Containers									
Outdoor Transformer 1 (Adjacent to Power Plant)	1,376	1,376	Silicone fluid	Impervious (0.02 feet zero-flow)	8.99	540	75	A release from an outdoor transformer would flow over the surface of the transformer's gravel-filled containment berm, and onto a gravel-covered area surrounded by a low (less than 6 inch) concrete berm. A spill that takes place during filling the transformer (there is a fill pipe located at the base of the containment berm) would also flow onto the gravel-covered area. This SPCC Plan assumes that the gravel covering would not impede the flow of released product.	• Concrete, gravel-filled containment berm • Periodic visual inspections • Spill equipment in readily accessible locations
Outdoor Transformer 2 (Adjacent to Power Plant)	1,294	1,294	Silicone fluid	Impervious (0.02 feet zero-flow)	8.99	540	73		
Transformer TSI-001 (Clinical 1 on School Level A)	320	320	Silicone fluid	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	36	A release from an indoor transformer would accumulate on the impervious floor of the building. A release into a floor drain would enter the sanitary sewer system, which discharges to the Upper Blackstone Water Pollution Abatement District.	• Spill equipment in readily accessible locations • Periodic visual inspections
Transformer TSI-002 (Clinical 1 on School Level A)	320	320	Silicone fluid	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	36		
Transformer TSI-005 (Basic #1 on School Level A)	320	320	Silicone fluid	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	36		
Transformer TSI-006 (Basic #1 on School Level A)	320	320	Silicone fluid	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	36		
Transformer TSI-007 (Student Lab 2 on School Level 8)	380	380	Silicone fluid	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	39		
Transformer TSI-008 (Student Lab 2 on School Level 8)	380	380	Silicone fluid	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	39		
Transformer TSI-009 (Basic #2 on School Level 8)	380	380	Silicone fluid	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	39		
Transformer TSI-010 (Basic #2 on School Level 8)	380	380	Silicone fluid	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	39		
Transformer TSI-011 (Clinical 2 on School Level 8)	380	380	Silicone fluid	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	39		
Transformer TSI-012 (Clinical 2 on School Level 8)	380	380	Silicone fluid	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	39		

TABLE 1
TANK INVENTORY, SPILL SCENARIOS, AND CONTAINMENT MEASURES

Vessel (Location)	Storage Volume (gallons)	Maximum Quantity Potentially Spilled (gallons)	Product	Surface Type (oil thickness at zero flow)	Height of Tank (m)	Flow Rate (gal/min)	Spill Radius (ft)	Spill Scenario	Containment Measures
Qualifying Containers									
Transformer TSI-013 (Sub SS-4 on Hospital Level 9)	360	360	Silicone fluid	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	38		
Transformer TSI-014 (Sub SS-2 on Hospital Level 9)	325	325	Silicone fluid	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	36		
Transformer TSI-015 (Sub SS-2 on Hospital Level 9)	325	325	Silicone fluid	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	36		
Transformer TSI-016 (Sub SS-1 on Hospital Level 9)	360	360	Silicone fluid	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	38		
Transformer TSI-017 (Sub SS-1 on Hospital Level 9)	360	360	Silicone fluid	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	38		
Transformer TSI-018 (Sub SS-5 on Hospital Level 9)	180	180	Silicone fluid	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	27		
Transformer TSI-019 (Sub SS-3 on Hospital Level 9)	325	325	Silicone fluid	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	36		
Transformer 1 (Ambulatory Care Center)	389	389	Silicone fluid	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	40		
Transformer 2 (Ambulatory Care Center)	353	353	Silicone fluid	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	38		
Generator at Biotech 4	1,000	1,000	Hydraulic Oil	Impervious (0.02 feet zero-flow)	2.08	Not Applicable	64	A release from the outdoor transformer would flow over the concrete pad and onto the grass-covered area surrounding the transformer pad. The release has the potential to infiltrate the grass and impact groundwater.	• Spill equipment in readily accessible locations • Periodic visual inspections
Life Flight Air Ambulance Helicopter (Heliport Garage)	187	187	Jet A Aviation Fuel	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	28	A release would flow onto the concrete pad of the Heliport Garage. The release has the potential to flow into the storm drain, which flows directly into Lake Quinsigamond.	• Spill equipment in readily accessible locations • Periodic visual inspections
Generators G1 (Power Plant First Floor)	300	300	Hydraulic Oil	Impervious (0.02 feet zero-flow)	0.92	260	35	A release would be contained in the secondary containment structure. A breach in the secondary containment would cause the release to flow onto the concrete floor. The release has the potential to enter a floor grate and flow to the lower lever that is equipped with floor drains. A release into a floor drain would enter the sanitary sewer system, which discharges to the Upper Blackstone Water Pollution Abatement District.	• Secondary containment • Spill equipment in readily accessible locations • Periodic visual inspections
Generators G2 (Power Plant First Floor)	300	300	Hydraulic Oil	Impervious (0.02 feet zero-flow)	0.92	Not Applicable	35		

TABLE 1
TANK INVENTORY, SPILL SCENARIOS, AND CONTAINMENT MEASURES

Vessel (Location)	Storage Volume (gallons)	Maximum Quantity Potentially Spilled (gallons)	Product	Surface Type (oil thickness at zero flow)	Height of Tank (m)	Flow Rate (gal/min)	Spill Radius (ft)	Spill Scenario	Containment Measures
Qualifying Containers									
Generators G1 Hydraulic Skid (Power Plant First Floor)	60	60	Hydraulic Oil	Impervious (0.02 feet zero-flow)	1.00	172	16		
Generators G2 Hydraulic Skid (Power Plant First Floor)	60	60	Hydraulic Oil	Impervious (0.02 feet zero-flow)	1.00	172	16		
Generator G3 (Power Plant First Floor)	650	650	Hydraulic Oil	Impervious (0.02 feet zero-flow)	1.96	180	52		
Chiller 4 Murray Turbine (Power Plant First Floor)	75	75	Hydraulic Oil	Impervious (0.02 feet zero-flow)	1.25	180	18		
Chiller 5 York Compressor (Power Plant First Floor)	55	55	Type K Oil	Impervious (0.02 feet zero-flow)	1.00	252	15		
Solar CTG (Power Plant First Floor)	739	739	Hydraulic Oil	Impervious (0.02 feet zero-flow)	2.46	201	55		
Enerflex Gas Compressor (Power Plant First Floor)	135	135	Hydraulic Oil	Impervious (0.02 feet zero-flow)	1.13	180	23	A release would be contained in the secondary containment area. A breach in the secondary containment would cause the release to flow onto the metal floor and onto the asphalt or adjacent pervious surface. If the pervious grass surface is infiltrated, the release has the potential to impact groundwater, which flows directly into Lake Quinsigamond.	• Secondary containment • Spill equipment in readily accessible locations • Periodic visual inspections
Drum Storage (Power Plant)	55	1,540	Various Oils	Impervious (0.02 feet zero-flow)	2.99	180	79	A release from a drum would be contained in the secondary containment pallet. A breach in the secondary containment would cause the release to flow onto the concrete floor. The release has the potential to enter a floor grate and flow to the lower lever that is equipped with floor drains. Oil entering a floor drain would enter the sanitary sewer system, which leads to the Upper Blackstone Water Pollution Abatement District.	• Secondary containment pallets • Spill equipment in readily accessible locations • Periodic visual inspections
Front Loader (Loading Dock)	79 50	129	Fuel Oil Lubricant	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	23	A release from the front loader would flow onto an impervious surface if stored at the Loading Dock, or potentially onto a pervious surface if the front loader is in use. If a pervious surface is infiltrated, the release has the potential to impact groundwater. If the front loader is in use in the vicinity of a catch basin, a release may enter the catch basin that empties into a storm drain, which flows directly into Lake Quinsigamond.	• Periodic visual inspections • Spill equipment in readily accessible locations
Elevator 348-F-741 (Med School, Loading Dock)	145	145	Hydraulic Oil	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	24	A release would accumulate on the impervious floor of the building. A release into a floor drain would enter the sanitary sewer system, which discharges to the Upper Blackstone Water Pollution Abatement District.	• Periodic visual inspections • Spill equipment in readily accessible locations

TABLE 1
TANK INVENTORY, SPILL SCENARIOS, AND CONTAINMENT MEASURES

Vessel (Location)	Storage Volume (gallons)	Maximum Quantity Potentially Spilled (gallons)	Product	Surface Type (oil thickness at zero flow)	Height of Tank (m)	Flow Rate (gal/min)	Spill Radius (ft)	Spill Scenario	Containment Measures
Qualifying Containers									
Elevator 348-P-2198 (South Garage)	180	180	Hydraulic Oil	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	27		
Elevator 348-P-2200 (South Garage)	180	180	Hydraulic Oil	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	27		
Elevator 348-P-2199 (South Garage)	180	180	Hydraulic Oil	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	27		
Elevator 348-F-743 (Teaching Hospital)	185	185	Hydraulic Oil	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	27		
Elevator 348-P-1880 (Benedict Building)	210	210	Hydraulic Oil	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	29		
Elevator 348-P-1879 (Benedict Building)	210	210	Hydraulic Oil	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	29		
Elevator 348-P-1838 (Power Plant)	200	200	Hydraulic Oil	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	29		
Elevator Cemco #1 (Albert Sherman Center)	250	250	Hydraulic Oil	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	32		
Elevator Cemco #2 (Albert Sherman Center)	250	250	Hydraulic Oil	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	32		
Elevator Passenger (Biotech 1)	210	210	Hydraulic Oil	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	29		
Elevator Freight (Biotech 1)	210	210	Hydraulic Oil	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	29		
Elevator 348-P-1346 (Biotech 2)	185	185	Hydraulic Oil	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	27		
Elevator 348-P-1347 (Biotech 2)	210	210	Hydraulic Oil	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	29		

TABLE 1
TANK INVENTORY, SPILL SCENARIOS, AND CONTAINMENT MEASURES

Vessel (Location)	Storage Volume (gallons)	Maximum Quantity Potentially Spilled (gallons)	Product	Surface Type (oil thickness at zero flow)	Height of Tank (m)	Flow Rate (gal/min)	Spill Radius (ft)	Spill Scenario	Containment Measures
Qualifying Containers									
Elevator 348-P-1825 ELV 1 (Biotech 3)	185	185	Hydraulic Oil	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	27		
Elevator 348-P-1826 ELV 2 (Biotech 3)	185	185	Hydraulic Oil	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	27		
Elevator ELV #1 *ADA* (Biotech 4)	150	150	Hydraulic Oil	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	25		
Elevator ELV #2 (Biotech 4)	134	134	Hydraulic Oil	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	23		
Elevator FRNT PASS (Biotech 5)	250	250	Hydraulic Oil	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	32		
Elevator BK SVC (Biotech 5)	250	250	Hydraulic Oil	Impervious (0.02 feet zero-flow)	Not Applicable	Not Applicable	32		

TABLE 2
TANK INVENTORY, SPILL SCENARIOS, AND CONTAINMENT MEASURES

Vessel (Location)	Storage Volume (gallons)	Maximum Quantity Potentially Spilled (gallons)	Product	Surface Type (oil thickness at zero flow)	Spill Radius (ft)
Non-Qualifying Containers					
Compactor (UMass Lazare Research Building)	15	15	Hydraulic Oil	Impervious (0.02 feet zero-flow)	8
Compactor (UMass Medical School)	15	15			8
Compactor (UMass Medical School)	20	20			9
Compactor (ACC Building)	15	15			8
Compactor (ACC Building)	15	15			8
Compactor (Bio Tech Five)	20	20			9
Compactor (Bio Tech Five)	20	20			9
Compactor (Bio Tech Four)	20	20			9
Compactor (Bio Tech One)	20	20			9
Compactor (Bio Tech Three)	20	20			9
Compactor (Bio Tech Two)	20	20			9
Compactor (BNRI)	20	20			9
Compactor (Receiving)	20	20			9
Compactor (Receiving)	20	40			13
Compactor (Receiving)	20	20			9
Compactor (Sherman Center)	20	20			9
Compactor (Sherman Center)	20	20			9
Compactor (Sherman Center)	20	20			9

3.6 SPILL CONTAINMENT

See Table 1, Section 3.5 for a summary of the spill containment measures used for the qualifying bulk storage containers and Outdoor Transformers 1 and 2 at the Facility. Although secondary containment is not required for oil-filled operational equipment and containers with a capacity below 55 gallons, most containers equipped at UMMS are provided with secondary containment. Additionally, the equipment is inspected regularly, and active containment measures will be implemented in the event of a release (i.e., use of spill control materials).

3.7 POTENTIAL FOR SPILLS

One of the major objectives of this SPCC Plan is to prevent the release of fuel oils. This Section describes potential releases associated with the qualifying bulk storage containers and oil-filled operational equipment that have a reasonable chance of occurrence at the Facility.

1. In most cases, a release that occurs during filling of any of the tanks or during fueling of Facility vehicles or the helicopter, would be contained an oil/water separator (oil/water separators are provided at the heliport and outside the Power Plant). In some cases (e.g., fueling the helicopter, a release from Tanks 1 or 2, etc.), the released oil could flow to nearby catch basins. To prevent releases to the catch basins during oil deliveries, truck drivers must follow the procedures outlined in Section 3.8. Spill control materials should be stored in appropriate locations of the Facility.

2. There are approximately 20 to 25 drums of oil and several pieces of equipment with oil capacities greater than 55 gallons at the Power Plant. A release from the drums or oil-filled equipment would flow onto the Power Plant’s concrete floor. Oil released on the main level of the Power Plant could enter metal grating and flow down to the lower level of the Power Plant. In the event that oil flowed into a floor drain, it would enter the sanitary sewer system, which leads to the Upper Blackstone Water Pollution Abatement District. Most floor drains at the Power Plant are collared, and the volume of oil of most containers is insufficient to reach a floor drain.

   A 300-gallon oil/water separator is used to collect blow-down from boilers in the Power Plant as well as condensate from trap drains. Overflow from this separator (which is not considered a container) is discharged to the sanitary sewer system.

Other release scenarios are not considered likely because the Facility has provided secondary containment and implemented spill prevention measures.

1. The tanks at the heliport (i.e., Tanks 1, 2, and 3) are double-walled tanks. A release would set off an alarm at the Power Plant console. If oil breached the secondary containment of the leaking tank, it would most likely flow into the oil/water separator located near the heliport. Water from the oil/water separator flows to the Upper Blackstone Water Pollution Abatement District sanitary sewer system, and oil would remain in the separator until removed/cleaned up by a spill contractor.

2. A release from the tanks in the Power Plant crypt (i.e., Tanks 4, 5, 6, 7, and 8) would be contained in the crypt. In the unlikely event that oil breached the crypt, it would be contained in the Power Plant basement.

3. Tank 9 is provided with a concrete secondary containment structure, and Tank 10 a double-walled tank that is contained within the Power Plant emergency generator enclosure. If oil breached either tank's secondary containment, it would flow into the oil/water separator located near the Power Plant. Water from the oil/water separator flows to the Upper Blackstone Water Pollution Abatement District sanitary sewer system, and oil would remain in the separator until removed/cleaned up by a spill contractor.

4. Tank 11 is located within a secured room with a recessed floor. A release from this tank would be contained in the room until removed/cleaned up by a spill contractor.

5. Indoor transformers (i.e., transformers other than Outdoor Transformers 1 and 2) are provided with secondary containment in the form of secured, bermed rooms or containment berms. Floor drains are not present near indoor transformers. A release from a transformer would collect in the secondary containment until UMMS personnel and/or spill contractors could respond with appropriate cleanup equipment.

6. A release of hydraulic fluid from any of the elevators located at the Facility would be contained within the elevator shaft. Elevator shafts do not have floor drains and the hydraulic fluid would remain in place until it was cleaned up by Facility personnel, an elevator maintenance contractor, or a spill response contractor.

7. A release from Outdoor Transformer 1 or Outdoor Transformer 2 would flow over the surface of the leaking transformer's gravel-filled containment berm, and onto a gravel-covered area surrounded by a low (less than 6 inches) concrete berm. A spill that takes place during filling the transformer (there is a fill pipe located at the base of the containment berm) would also flow onto the gravel-covered area.

8. Drums 22 and 23 are picked up approximately twice per month for use as biodiesel. A release from these containers would flow to a concrete floor and would not leave the storage room.

3.8 OIL TRANSFER POLICY

To minimize the potential for a release of oil during the filling of tanks at the Facility, the procedures described in this Section will be implemented by UMMS.

UMMS does not operate a Tank Truck Loading/Unloading rack. Instead, each tank is equipped with an independent filling location. UMMS has developed procedures for the fueling of tanks at the facility to minimize the likelihood of spills/releases occurring during the fueling of these tanks. These procedures are as follows:

- driver reports to shift supervisor on arrival;
- shift supervisor verifies that UMMS is the customer by reviewing paperwork;
- shift supervisor verifies the sulfur content of the fuel is equal to or less than 0.5 percent for No. 6 oil, or that ultra-low sulfur diesel (ULSD) is provided for No. 2 fuel oil;
- engineer accompanies the driver to fill area;
- engineer and driver ensure that a screen is installed in the fill pipe;
- engineer and driver verify that there are no rags in fill box or fill pipe;
- when receiving No. 6 oil, engineer and driver make sure trailer is warm;
- engineer monitors driver while the fill hose is installed in the fill pipe to ensure that rags are not used or oil spills occur;
- driver notifies shift supervisor when the truck is empty;
- engineer accompanies driver while the fill line is removed and covers are put back on to ensure that rags are not used or spills occur; and
- shift supervisor signs paperwork.

The procedures require supervision of the entire delivery process and require that the delivery vehicle is parked as close as practical to the tank to be filled to minimize delivery hose length. Additionally, prior to filling a tank, UMMS personnel manually verify the volume of fuel in the subject tank, and ensure the driver acknowledges that amount of oil to be added. See Appendix C for the Facility's fuel transfer policy.

3.9 SUPPLIES

The following supplies are readily available throughout the Facility (see Appendix D):

- spill kit that includes oil-absorbent material (e.g., Speedi-Dri™ and oleophilic pads), gloves, salvage drum, plastic sheeting, and spill containment socks; and

- shovel and broom to facilitate construction of temporary berms and clean-up of possible releases.

Additionally, dispensing hoses (from delivery trucks) must be fitted with breakaway couplings that would allow a safe break of the hose from the dispenser in the event of the vehicle driving away with the nozzle still in the fuel tank.

3.10 SECURITY

UMMS operates 24 hours a day. Security is provided at UMMS to promote Facility integrity, safeguard the Facility from theft and vandalism, and protect the community from potential hazards associated with theft and vandalism at the UMMS site.
The Facility is located in a well-lit area and is staffed at all times. Additionally, the UMMS campus is continuously patrolled by the University of Massachusetts Police Department (UMPD).

4.0 EMERGENCY PERSONNEL AND TRAINING

4.1 EMERGENCY PERSONNEL RESPONSIBILITIES

Responsibilities for spill response duties are assigned to individuals; however, responsibilities are designated primarily by position/title/descriptions. If individuals are not available because of vacations, trips, transfers, terminations, etc., the person filling the position automatically assumes the responsibility associated with that position.

4.1.1 Management

Management and supervisory personnel must review this SPCC Plan annually to ensure that they are familiar with its contents.

4.1.2 SPCC Coordinator

The SPCC Coordinator will receive training on applicable federal and state regulations and company policies. The SPCC Coordinator will direct and coordinate the emergency plan or release response activities and will advise management and company officers as to the extent of the emergency and possible consequences. The SPCC Coordinator will be familiar with environmental controls and devices (e.g., spill kits) and hazard response firms/teams. The SPCC Coordinator will also establish liaison and communications, as necessary, with appropriate agencies and allocate resources necessary to carry out the duties of this SPCC Plan.

Maintenance personnel are responsible for assisting the SPCC Coordinator and for the safe shutdown of the Facility. After the emergency or release event is under control, the SPCC Coordinator will direct recycling and salvage activities and then restart operations, as appropriate.

If the SPCC Coordinator is unavailable, the Secondary SPCC Coordinator will be contacted. The Secondary SPCC Coordinator shall have equivalent training to the SPCC Coordinator and shall be authorized to contact the emergency contractors and outside agencies.

The SPCC Coordinator will provide information to the Public Affairs Office if information will be released to the news media.

4.1.3 Employees

Individuals are responsible for notifying the SPCC Coordinator of changes in home or office telephone numbers and position so that the call list can be updated. Personnel who handle oil shall implement the oil handling procedures listed in the plan and implement the spill control and response actions under the direction of the SPCC Coordinator.

4.2 SPILL PREVENTION TRAINING

The Facility personnel described in Sections 4.2.1 and 4.2.2 will be trained annually on spill and emergency response procedures, including the requirements of this SPCC Plan. Managers and supervisors will assist the SPCC Coordinator in training personnel, as necessary.

The initial and annual SPCC training shall include: an introduction to pollution control laws; reporting, stopping, containing, recovering, and disposing spilled materials; and evacuation, fire control, and emergency communications. Records will be maintained in the office of the SPCC Coordinator to document personnel emergency response training using the example form attached in Appendix E. Initial training will be conducted by, or under the supervision of, the SPCC Coordinator or a designated representative. Supervisors may conduct training for Facility personnel after the initial training by the SPCC Coordinator (or designee) is completed. Suggestions for improvement or modifications to the SPCC Plan should be directed to the SPCC Coordinator for review and possible inclusion in the next plan revision.

4.2.1 Permanent Personnel

The following training is required for permanent personnel who have oil-handling responsibilities.

- Facility personnel will participate in annual training that informs them of how to perform their duties in a manner to prevent the discharge of harmful quantities of oil. This training will include familiarization with safety data sheets (SDSs) applicable to the job assignment, emergency response procedures, policies, equipment, and systems.

- Facility personnel will be trained to understand how spills may occur, where they may travel, and how to manage potential release scenarios. Personnel will be made aware of sensitive environments and receptors at or near the Facility.

- Facility personnel will be instructed annually regarding their responsibilities for compliance with the requirements of the spill laws and emergency response regulations applicable to the Facility.

- This SPCC Plan will be used as the basis for training of permanent employees to facilitate instruction on the use and location of appropriate spill prevention and control measures, locations and use of fire control equipment, and health and safety precautions.

Personnel associated with oil-handling activities will be trained prior to commencing oil-handling activities.

4.2.2 Transient Personnel

Transient personnel that may be involved with oil-handling activities will be advised of applicable spill prevention measures upon entering the Facility. These personnel may include contractors, subcontractors, and hired temporary personnel.

4.2.3 Tank Truck Drivers

Tank truck drivers loading materials at the Facility shall be made aware of and adhere to this SPCC Plan. Notices to tank truck drivers will be posted at the Power Plant and Heliport. A sample notice is included in Appendix C. Additionally, UMMS personnel will continue to be sure that drivers follow the oil transfer policy discussed in Section 3.8.

5.0 FACILITY INSPECTIONS AND PERMITS

5.1 REQUIRED INSPECTIONS AND INSPECTION SCHEDULE

Qualifying bulk storage containers and oil-filled operating equipment, as well as the Facility's hazardous waste/waste oil storage area(s) must be inspected to ensure that they comply with the requirements of this SPCC Plan, the Facility's Integrated Contingency Plan (ICP), and applicable regulations. Tanks must also be tested in accordance with inspection standards established by the Steel Tank Institute (STI) and American Petroleum Institute (API). Inspections and testing help to prevent discharges by verifying the strength and imperviousness of containers and ensuring they are suitable for continued service under current and anticipated operating conditions (e.g., product, temperature, pressure). Testing may also help determine whether corrosion has reached a point where repairs or replacement of the container is needed, and thus avoid unplanned interruptions in Facility operations.

The inspections required for the equipment owned and operated by UMMS are summarized in Table 3.

TABLE 3
SUMMARY OF REQUIRED CONTAINER INSPECTIONS

Container	Date Installed	Weekly	SPCC/STI Monthly	SPCC/STI Annual	Use Permit Annual	API External and Leak Every 5 Years	API Internal Every 10 Years	STI External Every 20 Years
		UMMS Personnel			MA P.E.	API Inspector		STI Inspector
Tank 1 Heliport (for Emergency Generator) – 9,600 gallons	Unknown		X	X				X – 2019
Tank 2 Heliport (for Emergency Generator) – 3,000 gallons	Unknown		X	X				
Tank 3 (Heliport) – 6,000 gallons	Unknown		X	X				X – 2019
Tanks 4 through 8 Power Plant – 84,000 gallons	~1975		X	X	X	X - 2019	X - 2019	
Tank 9 (Diesel) (Vehicle Fueling Area) – 4,000 gallons	Unknown		X	X				
Tank 9 (Gasoline) (Vehicle Fueling Area) – 2,000 gallons	Unknown		X	X				
Tank 10 (Vehicle Fueling Area) - 100 gallons	Unknown		X	X				
Tank 11 (Ambulatory Care Center) – 3,000 gallons	Unknown		X	X				
Hazardous Waste Drum Storage – 55 gallons	Not Applicable	X	X					
Transformers	Not Applicable		X					
Generators	Not Applicable		X					
Life Flight Air Ambulance Helicopter (Heliport Garage) - 187 gallons	Not Applicable		X					
Chiller 4 Murray Turbine (Power Plant First Floor) - 75 gallons	Not Applicable		X					
Chiller 5 York Compressor (Power Plant First Floor) - 55 gallons	Not Applicable		X					
Solar CTG (Power Plant First Floor) - 739 gallons	Not Applicable		X					
Enerflex Gas Compressor (Power Plant First Floor) - 135 gallons	Not Applicable		X					
Front Loader (Loading Dock) - 129 gallons	Not Applicable		X					
Elevators	Not Applicable		X					

5.1.1 Weekly Hazardous Waste Oil Area Inspections

The Facility collects hazardous waste in the form of waste oil. As required by 310 CMR 30, the hazardous waste oil storage area must be inspected on a weekly basis for the items identified on the Hazardous Waste Storage Weekly Checklist included in Appendix F.

5.1.2 Monthly Bulk Container and Equipment Inspections

Qualifying bulk storage containers and oil-filled operating equipment should be properly maintained to prevent oil leaking from bolts, gaskets, rivets, seams, and any other part of the vessel. The SPCC Coordinator or designated employee shall regularly inspect the Facility for malfunctions, deterioration, operator errors, and discharge that may be causing or may lead to spills of oil. A documented monthly inspection of qualifying bulk storage containers and oil-filled operating equipment will maximize the chances of identifying problems in time to correct them before a spill occurs. During these monthly inspections, personnel will inspect the integrity of the equipment and note visible oil leaks that may be present. If leaks are identified, they will be noted on the inspection form and immediately reported to the SPCC Coordinator. Leaks should be repaired at once. In some cases, the product in the vessel may require removal. An inspection form is included in Appendix F.

5.1.3 Annual SPCC/STI Inspections

Annual inspections are required for ASTs storing flammable and combustible liquids. These inspections are intended to identify the condition of and changes to each container and are require a more thorough check than the monthly inspections. During these inspections, the shell, containment, and foundation of each tank will be reviewed to ensure that they are undamaged, and the inspector will ensure that the cathodic protection system or other leak detection system is functioning properly. Finally, vents, valves, piping, and other auxiliary equipment will be inspected to ensure that it is functioning properly. An inspection form is included in Appendix F.

5.1.4 Annual Use Permit Inspections

ASTs storing greater than 10,000 gallons of flammable and/or combustible liquids must comply with 502 CMR 5.00. 502 CMR 5.00 requires that ASTs storing greater than 10,000 gallons of any material other than water are inspected annually by a Professional Engineer (P.E.) registered in the state of Massachusetts or by an API-certified inspector. Owners and operators of these ASTs must conduct these inspections to obtain a use permit from the Massachusetts State Fire Marshal. An inspection form is included in Appendix F.

5.1.5 API External and Leak Inspections (Every 5 Years)

The five tanks in the Power Plant crypt must be inspected in accordance with the API Standard 653 for Tank Inspection, Repair, Alteration, and Reconstruction (API-653). Every five years, a formal external and leak inspection must be conducted by an API-certified inspector. Measurements of the tops, bottoms, and walls of the tank will ensure that it has sufficient strength (structural soundness) to contain oil. Leak testing will determine whether a tank is likely to discharge oil.

5.1.6 API Internal Inspections (Every 10 Years)

Every ten years, a formal internal inspection, conducted by an API-certified inspector, must be conducted on the tanks in the Power Plant crypt. These inspections require that tanks be emptied and allow inspectors to check for cracks, pitting, or other suggestions of weakness in the top, bottom, or walls of a tank.

5.1.7 STI External Inspections (Every 20 Years)

Based upon their type, capacity, and configuration, the tanks associated with the emergency generator, heliport, and fueling area meet the requirements of Category 1 ASTs and must be inspected in accordance with the requirements of the STI Standard for Inspection of In-Service Shop Fabricated ASTs for Storage of Combustible and Flammable Liquids (SP001-05). STI Category 1 tanks with a capacity of more than 5,000 gallons are subject to formal external inspections, conducted by an STI-certified inspector. The 9,600-gallon diesel tank associated with the hospital emergency generator and the 6,000-gallon jet A fuel tank at the heliport must undergo an STI-certified external inspection every 20 years. These inspections include a visual evaluation to ensure that the tops, bottoms, and walls of tanks are sufficiently strong and structurally sound.

5.2 PERMITS

5.2.1 Facility License for Storage of Greater than 10,000 Gallons of Flammable or Combustible Liquid

Under Massachusetts General Law (MGL) Chapter 48, Section 13 and the Board of Fire Prevention Regulations 527 CMR 1, UMMS is required to obtain a flammable/combustible storage license from the local licensing authority in the City of Worcester, Massachusetts (the City) because the Facility exceeds the exempt flammable liquid storage threshold listed in 527 CMR 1 Section 1.12.8.50. Holders of this license must also complete an annual registration with the City.

5.2.2 Facility Permit for Storage of Flammable or Combustible Liquids

In addition to the license described in Section 5.2.1, Massachusetts Fire Prevention Regulation 527 CMR 1 Section 1.12.8.50 also requires flammable/combustible storage permits to be obtained from the Worcester Fire Department because the Facility stores Class I, II, and III, flammable and combustible gasses and solids stored above certain thresholds. This permit must be renewed annually. AST 1,2, and 11 were not listed on Facility storage permits, and should be included in the annual renewal.

5.2.3 Individual Tank Permits

Massachusetts Fire Prevention Regulations 527 CMR 1 Section 1.12.8.40.2.2, 502 CMR 5, and MGL, Chapter 148, Section 37, require facilities to obtain a permit from the State Fire Marshal for individual tanks with a capacity of 10,000 gallons and greater that are used to store any liquid other than water. These permits must be renewed annually. The five 84,000-gallon tanks in the crypt are subject to this permitting requirement.

5.3 INSPECTION AND PERMIT RECORDS

Records of the inspections described in Section 5.1 will include the type of inspection performed, inspector's name, date of inspection, and noted deficiencies. The inspection forms will be kept on file at the Facility for a minimum period of three years. Additionally, records of monthly and annual inspections of tanks greater than 10,000 gallons will be maintained for five years beyond the demolition of the tank.

Copies of the license and permit identified in Sections 5.2.1 and 5.2.2 must be conspicuously posted at the Facility. Permits issued for individual ASTs (i.e., the permits described in Section 5.2.3) must be conspicuously posted near the ASTs to which they apply.

6.0 EMERGENCY PROCEDURES/SPILL RESPONSE

6.1 GENERAL

UMMS maintains an ICP that addresses Facility-wide emergency procedures and spill response. This SPCC Plan is specific to the prevention and control of spills of oils and fuels. Hazardous material spills, with the exception of waste oil, are not covered under this SPCC Plan; see the ICP for more details.

USEPA regulations define a spill event as the discharge of oil into, or upon, the navigable waters of the United States or adjoining shorelines in harmful quantities. Harmful quantities are defined as a discharge that violates applicable water quality standards or causes a sheen upon, or discoloration of, the surface of the water or the adjoining shorelines. Impacted groundwater that may also have the potential to seep, leach, or flow into navigable water would be included in this definition. For the purposes of 40 CFR Part 112, storm sewers are considered to fall under the definition of a "navigable waterway."

An important facet of an effective response procedure to be implemented during an oil release incident is to keep the oil separated from the water to minimize potential migration and the resulting potential increase in human and environmental exposure. Every effort should be made to prevent spills and emphasize containment at the source.

6.2 DISCOVERY OF A RELEASE

The Facility personnel discovering a release of material from a container, tank, or operating equipment should initiate the following activities immediately, provided that the spill does not involve an active fire:

- if safe to do so, attempt to identify the material spilled and the approximate volume;
- locate the closest phone;
- notify the SPCC Coordinator of the spill;
- immediately notify EH&S at Extension 63985;
- notify Operations at Extension 63292 of the spill;
- if the spill represents an imminent hazard (see Section 6.2.1), immediately initiate evacuation procedures and call the UMPD at Extension 911; and
- if the spill does not represent an imminent hazard, attempt to contain and isolate in a manner consistent with training and available spill control equipment.

The following information must be provided when notifying the SPCC Coordinator, Operations, and EH&S:

- the nature of the emergency: fire, spill, severe injury, etc.;
- the location of the emergency;
- the number of individuals involved in the emergency and the extent of any injuries: specify if anyone is immobilized or trapped in the area; and
- the duration of the emergency: how long has it been since the emergency occurred or was encountered.

The SPCC Coordinator determines whether additional emergency response actions should be initiated. The SPCC Coordinator and members of the response team will assess the situation and determine the tools, materials, and organizations that are necessary to remedy the condition.

6.2.1 Imminent Hazard Conditions

The following conditions should be considered as potential imminent hazards:

- a release that poses a significant risk to human health, safety, or the environment if present for even a short period of time;
- vapors present at >10 percent of the Lower Explosive Limit (LEL) in any structure or utility conduit;
- a release of flammable or reactive material where it may endanger employee, visitor, student, or public safety;
- a release that produces readily apparent adverse effects to human health including respiratory distress or skin irritation;
- a release to a roadway surface that endangers public safety; or
- a release causing immediate acute adverse impacts to fish populations.

6.3 SPILL CONTAINMENT

If material is released outside a containment area, it is critical that the material is accurately identified, and appropriate control measures are taken in the safest possible manner. Consult the SDS file in the Power Plant. To contain a release, the following general procedure should be followed.

- **Contain the material released into the environment.** Following proper safety procedures, the spill should be contained by absorbent materials and temporary dikes using shovels and brooms. Spill kits that include absorbent materials, containment socks, rags, and salvage drums are located at the Facility. Consult applicable SDSs for material compatibility, safety, and environmental precautions. Consult the SPCC Coordinator for further instructions.

- **Continue the notification procedure.** The SPCC coordinator will contact outside contractors to obtain assistance cleaning up the spill, if necessary.

The SPCC Coordinator will make notifications as required to the Massachusetts Department of Environmental Protection (MassDEP), USEPA Region 1, and the National Response Center. See the notification information presented in Section 7.0.

- **Initiate documentation of spill.** Begin the incident report form (see Appendix F) and collect photos of the spill showing all phases of the spill and clean up.

6.4 SPILL RESPONSE

6.4.1 General

The following actions will be taken by the Facility in response to spills or accidental discharges of oil.

- The source of the release will be identified, and immediate corrective actions will be taken to stop the discharge of oil (Sections 6.2 and 6.3).

- Immediate steps will be taken to prevent spilled oil at the Facility from reaching the waters of Massachusetts.

- The first personnel to arrive at the spill location will respond to the spill using available spill response equipment and materials in a manner commensurate with their training. Immediate measures will be taken to prevent the release from entering catch basins. Countermeasures may include placing spill mat(s) over catch basins and placing spill booms or absorbents in the path of the release. Sorbent materials will be used to the maximum extent possible to contain the oil.

- If the release reaches the waters of Massachusetts, UMMS will be responsible for having immediate steps taken to contain the oil in as small an area as possible. The oil will then be removed and disposed of in a manner approved by the MassDEP to minimize pollution.

- Facility personnel will immediately call an Environmental Spill Response Company for implementation of containment measures if and when a release reaches the waters of Massachusetts and the containment and/or if clean-up is beyond the scope of UMMS personnel training and capabilities.

- If the release occurs during a transfer operation, the transfer will be immediately stopped and measures to stop the release and contain the oil will commence immediately. Notification procedures will be initiated as soon as possible.

- If released oil saturates the surrounding area, one or more of the Environmental Spill Response Company will be notified at the discretion of the SPCC Coordinator to remove the released oil and oil-impacted debris.

6.4.2 Oil Spills <10 gallons

For small spills, the following procedures will be followed:

- immediately notify the SPCC Coordinator or the secondary SPCC Coordinator;
- mobilize spill clean-up crew;
- locate the source of spill and immediately stop discharge, if possible;
- block off the area to prevent traffic flow from entering the spill area;
- notify people in the immediate area;
- deploy spill clean-up materials (e.g., sorbent boom, sorbent pads, granular adsorbent material, etc.) as appropriate; and
- prepare an internal spill report to document the cause of the spill and possible ways to prevent a future similar spill.

6.4.3 Oil Spills ≥10 Gallons

For large spills, the following procedures will be followed:

- immediately notify the SPCC Coordinator or the secondary SPCC Coordinator;
- locate the source of spill and immediately stop the discharge, if possible;
- if there is a potential for fire (or ANY release from a tank), the SPCC Coordinator must call the City Fire Department immediately;
- notify and mobilize spill clean-up contractor;
- block off the area to prevent traffic flow from entering the spill area;
- deploy spill clean-up materials (e.g., sorbent boom, sorbent pads, granular adsorbent material, etc.) as appropriate, and try to contain the spill until the spill contractor arrives;

- notify the MassDEP and the facility Licensed Site Professional (LSP) if the spill is greater than the reportable quantity (10 gallons for fuel/lubricating/hydraulic oil and 55 gallons for cooking oils and cooking waste oils released over a period of 24 hours or less) (**Do not continue with clean-up activities [other than containment] until AFTER obtaining approval from the MassDEP**);

- notify the National Response Team if the spill has entered a waterway; and

- prepare an internal spill report to document the cause of the spill and possible ways to prevent a future similar spill.

6.5 SPILL CLEAN-UP AND DISPOSAL PROCEDURES

Containment and clean-up operations shall be performed in accordance with safe work practices. Personnel shall utilize appropriate personal protective clothing and equipment when required. Clean-up of the oil and debris should include the following precautions and procedures.

- Once a spill has been contained, and the leak repaired, clean-up crews may begin to remove the released oil using oil sorbent materials. If the release is greater than 10 gallons of oil (or 55 gallons of cooking oil or waste cooking oils), then cleanup can be initiated only AFTER obtaining approval from the MassDEP. On permeable surfaces, this will include removing the affected surface material around the spill site. The oil spill area will be cleaned up to visible traces or as otherwise required by the MassDEP response staff.

- Clean-up materials, including protective clothing (if impacted with oil) will be placed in standard Department of Transportation open-top drums. Drums should be filled with sufficient absorbent material to eliminate free liquids.

- Full drums should be covered with the appropriate lid and ring. The drum should be labeled with material name, hazard identification, and the date of generation.

If an Environmental Spill Response Company has responded to the spill, the oil and oil-impacted material will be removed from the Facility by the contractor and brought to a licensed disposal facility. If only Facility personnel have cleaned up the release, the removal of oil and oil-impacted material will be coordinated by the Facility.
The recovered oil and oil-impacted debris will be transported by a licensed transporter and disposed of at a licensed disposal facility authorized to receive such material. Upon completion of the spill clean-up, the SPCC Coordinator will document and report the incident to the appropriate agencies, as necessary. Personnel responding to a release of oil are authorized to use whatever resources are necessary to control the spill. Emergency response contractors may also supply equipment and materials necessary to control and clean-up a spill.

6.6 SENSITIVE RECEPTORS

To the greatest extent possible, response actions will be taken to ensure the protection of sensitive receptors such as wetlands, streams, lakes, rivers, or aquifer protection zones. The nearest receptor is Lake Quinsigamond.

6.7 COMMUNICATIONS

In case of a fire, spill, or other emergency, paging systems or cell phones can be used to contact personnel. Telephones are also located in the Facility.

6.8 SPILL, FIRE, AND SAFETY EQUIPMENT

Portable fire extinguishers are located throughout the Facility. Records are kept regarding fire equipment and quarterly testing of the fire alarm system is performed in accordance with accepted procedures. A list of spill, fire and safety equipment that should be available to protect employees and provide containment of constituents in the event of a spill is provided in Appendix D.

7.0 REPORTING PROCEDURES/EMERGENCY CONTACTS

7.1 INTRODUCTION

In the event of an accident or oil spill at the Facility, the SPCC Coordinator or Secondary SPCC Coordinator will be contacted by the person that discovers the release as soon as practical after the incident has occurred. If a spill discharge to surface waters is imminent, the regulatory agencies should also be notified as outlined below. Emergency contacts and a spill response procedure are included in Appendix G.

7.2 INTERNAL REPORTING

In the event of ANY spill, the following contacts shall be made:

Operations: Extension 63292

EH&S: Extension 63985

SPCC Coordinator: Jo-Ann Ranslow
Office Phone: (508) 856-6723
Cell Phone: (508) 735-6263
Pager: (508) 722-0020

Secondary SPCC Coordinator: Matt Bosselait
Office Phone: (508) 856-8461
Cell Phone: (978) 875-2269

SPCC Coordinators (Power Plant only):
Name: Joe Collins
Office Phone: (508) 856-2220
Pager: (508) 722-3359

Name: Bruce Hjort
Office Phone: (508) 856-2153
Cell Phone: (774) 312-1727

Additionally, the local Fire Department may need to be contacted, as described in Section 7.3.4.

Spills that are regulated under this SPCC Plan must be documented in an official report. The report shall be prepared by the SPCC Coordinator or his designee.

At a minimum, the report will document the following items:

- date, time, and duration of release;
- source location, material(s) released, and total volume (best estimate) of the release;
- spill clean-up procedures;
- personnel who discovered and/or participated in the spill response;
- equipment used during the clean-up;
- wastes generated and associated disposal method(s); and
- unusual events, injuries, or agency inspections.

7.3 REPORTING TO OUTSIDE AGENCIES

The SPCC Coordinator (or designee) will report to outside agencies when required.

7.3.1 Federal

The National Response Center (NRC) will be contacted immediately if the SPCC Coordinator determines that there has been a fire, explosion, spill, or other release, which could threaten public health, safety, welfare, or the environment. The SPCC Coordinator will provide the following information:

- name and telephone number of the facility contact;
- name and address and USEPA Identification Number (waste ID number) of the generator;
- date, time, and type of incident;
- extent of injuries, if any;
- estimated quantity and disposition of recovered materials, if any; and
- possible hazards to human health or the environment.

National Response Center
(800) 424-8802

USEPA, Region 1
5 Post Office Square, Suite 100
Boston, Massachusetts 02109-3912
Phone: (888) 372-7341

Follow-up reporting will be completed as outlined in Section 7.5 of this SPCC Plan and Annex 7 of the ICP.

7.3.2 State

The MassDEP requires notification of any discharge or threat of release of hazardous material which, when released, poses a threat to human health or the environment, such as releases to a storm or sanitary sewer, onto the land, into the air, groundwater, or surface water within two hours of the discovery of the release.

Nationally-listed reportable quantities are typically listed with the product SDS. In general, reportable quantities in Massachusetts are listed by weight or volume and are the same or lower than the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Emergency Planning & Community Right-to-Know Act (EPCRA) Section 302 Extremely Hazardous Substance Reportable Quantity documents reportable quantities.

UMMS should carefully assess which response agencies should be notified. If there is a question whether a spill must be reported, the SPCC Coordinator should contact their compliance consultant, or confirm with the respective agency.

MassDEP must be notified within the applicable time period of releases meeting the 2-hour notification requirements of 310 CMR 40.0311/312 and of releases meeting the 72-hour notification requirements of 310 CMR 40.0313.

MassDEP 24-hour Spill Hotline
(888) 304-1133

In the event of a release which poses a threat to human health or the environment, the SPCC Coordinator will be prepared with the following information:

- name and telephone number of the caller;
- name and address of the facility/location of the release;
- date and time the release occurred;

- name of the hazardous waste or material released;
- approximate quantity of the material which has been released;
- source of the release;
- brief description of the release;
- the extent of injuries, if any;
- name and telephone number of the owner/operator of the site where the release has occurred;
- name and telephone number of a contact person at the site where the release has occurred; and
- description of immediate response actions taken or proposed to be taken in response to the release.

Follow-up response actions will be taken by UMMS, as required, and reporting to the MassDEP will be completed as outlined in Section 7.5 of this SPCC Plan and in Annex 7-1.5 of the ICP.

7.3.3 Local

In accordance with 527 CMR 1, the Facility will immediately notify the head of the local fire department in the event of a leak from one of the tanks because they hold combustible substances. The SPCC Coordinator will also determine the need to contact the local police or other local emergency planning or response organizations.

Worcester Fire Department
(508) 799-1821 or 911

Worcester Police Department
(508) 799-8606 or 911

7.3.4 Community Notification

The Incident Commander typically makes Community notification after an assessment of on-scene conditions. The SPCC Coordinator should indicate the potential for community notification to the Incident Commander who will advise appropriate action.

7.4 OTHER EMERGENCY CONTACTS

The following other emergency contacts will be contacted, as needed:

UMMS Memorial Medical Center
Worcester, Massachusetts
(508) 334-1000

Massachusetts State Police
(508) 820-2300

Poison Control Center
(800) 222-1222

The following are licensed clean-up contractors that can be contacted to assist in emergency spill situations:

Clean Harbors	**New England Disposal Tech**
(800) 645-8265	**(800) 698-1865**

7.5 POST-INCIDENT ACTIVITIES

Post-incident activities are covered in Annex 7 of the ICP.

7.5.1 Conditions

Following an incident, the Facility must be carefully evaluated to determine whether the area of the incident is safe for work. Entry into the Facility or incident area may not occur without prior authorization by the Incident Commander and SPCC Coordinator. If municipal authorities are involved, they will determine when the building is cleared for re-occupancy.

After re-occupancy authorization, but before resuming normal operations, the SPCC Coordinator will inspect the incident area for signs of damage caused by any spilled material or as a result of the incident. Any damaged equipment will be immediately taken out of service (locked-out) until repairs can be made. In addition, the floors must be rendered slip-free by removing any standing debris or water. State and local authorities must be notified that the facility is in compliance with 40 CFR 265.56(h)(1) and (2) prior to resumption of production operations.

Concurrent with Facility startup operations, waste materials that remain on-site after the response will be properly containerized, labeled, and stored in the hazardous waste accumulation area.

7.5.2 Incident Investigation

Within 24 hours of the incident or spill event, an incident investigation will be performed to determine what caused the emergency or spill of hazardous chemicals and initiate an action plan to prevent re-occurrence. The action plan will include detailed explanations of the necessary activities including responsible persons and target dates. Interim protective measures will also be documented in the action plan. After completion, the action plan will be maintained in the Facility's operating records.

7.5.3 Response Critique

As soon as possible, but no later than one week after the event, the SPCC Coordinators shall meet to discuss the response and identify opportunities for improvement. Responding municipal authorities are requested to attend this meeting. Action items will be developed in accordance with the meeting and a schedule for implementation will be developed.

7.5.4 Replenishment

Spill control materials and emergency equipment used during spill response will be replenished as soon as possible but no later than one week after the spill event. Spill control materials must be brought to the levels indicated in Appendix E of the ICP. If changes are made to the type or quantity of spill control equipment stored on site, the list in Appendix E of the ICP must be modified as well.

7.5.5 Reporting

7.5.5.1 MassDEP Release Reporting

In accordance with the Massachusetts Contingency Plan (310 CMR 40.0371) Release Notification Form, written notification of releases or threats of releases required under 310 CMR 40.0333 shall be submitted by the Facility on the form for such purposes and shall include, without limitation, the following:

- the location and address where the release or threat of release occurred;
- the time and date when the release or threat of release occurred;
- the time and date when the person required to provide the notification to the MassDEP pursuant to 310 CMR 40.0331 obtained knowledge that the release or threat of release met one or more sets of notification criteria established in 310 CMR 40.0311 through 40.0315;
- the time and date when oral notification of the release or threat of release was made to the MassDEP, if applicable;

- the set(s) of notification criteria met, as specified at 310 CMR 40.0311 through 40.0315;

- the names and amounts of oil and/or hazardous material released or threatened to be released;

- the names and mailing addresses of the owners of all properties impacted by the release or threat of release;

- the name and address of the person providing the notification of the release;

- the affiliation of the person making the notification to the site of the release or threat of release, as described in 310 CMR 40.0331;

- a signed and dated certification statement from the person reporting the release or threat of release attesting to the truth and accuracy of the information provided, as specified at 310 CMR 40.0009; and

- such other information as the MassDEP may from time-to-time determine is necessary and useful in the fulfillment of its statutory obligations under M.G.L. c. 21E and 310 CMR 40.0300.

This form shall be accompanied by the Release Action Outcome Statement. An LSP opinion is required for submission of these forms.

7.5.5.2 USEPA Oil Spill Reporting

Under 40 CFR 112.4, whenever a Facility has discharged more than 1,000 U.S. gallons of oil into or upon the navigable waters of the United States or adjoining shorelines in a single spill event, or discharged oil in harmful quantities, as defined in 40 CFR part 110, into or upon the navigable waters of the United States or adjoining shorelines in two spill events, reportable under section 311(b)(5) of the Federal Water Pollution Control Act, occurring within any 12-month period, the owner or operator of such Facility shall submit to the USEPA Regional Administrator, within 60 days from the time such the Facility becomes subject to this section, the following:

- name of the Facility;

- name(s) of the owner or operator of the Facility;

- location of the Facility;

- date and year of initial Facility operation;

- maximum storage or handling capacity of the Facility and normal daily throughput;
- description of the Facility, including maps, flow diagrams, and topographical maps;
- a complete copy of the SPCC Plan with any amendments;
- the cause(s) of such spill, including a failure analysis of system or subsystem in which the failure occurred;
- the corrective actions and/or countermeasures taken, including an adequate description of equipment repairs and/or replacements;
- additional preventive measures taken or contemplated to minimize the possibility of recurrence; and
- such other information as the Regional Administrator may reasonably require pertinent to the plan or spill event.

A complete copy of all information provided to the USEPA Regional Administrator shall be sent at the same time to the State agency in charge of water pollution control activities in and for the State in which the Facility is located. Upon receipt of such information such State agency may conduct a review and make recommendations to the USEPA Regional Administrator as to further procedures, methods, equipment and other requirements for equipment necessary to prevent and to contain discharges of oil from such Facility.

8.0 RECORDKEEPING

8.1 DOCUMENTATION

This Section refers to the documents and inspection records that must be retained on file for a minimum of three years as required in this SPCC Plan:

- maintenance and inspection activities, as described in Section 5.0 (hazardous waste inspection records must be maintained for three years);
- spill reports and documents, as described in Section 7.0; and
- documentation related to the implementation of Facility improvements summarized in Section 9.0.

8.2 DISTRIBUTION OF PLAN TO OUTSIDE AGENCIES

Copies of this SPCC Plan will be submitted to the local fire department, police department, and hospital upon request. In addition, familiarization sessions will be held with personnel from these organizations, if requested. It is important that personnel responding to an oil related emergency be familiar with materials used, the possibilities for releases, and the location of the response equipment.

9.0 FACILITY IMPROVEMENTS

9.1 REQUIRED IMPROVEMENTS

The Facility must implement the following improvements and modifications to be in compliance with 40 CFR Part 112:

- The five 84,000-gallon ASTs located in the crypt must undergo inspection by a third party. They are subject to API inspection requirements as outlined in Section 5.0. Records of the inspections should be maintained.

- Massachusetts requires that ASTs containing greater than 10,000 gallons of any liquid other than potable water must be inspected annually by a certified inspector (527 CMR 1). UMMS must conduct a tank inspection for each of the five 84,000-gallon tanks in the crypt.

- Monthly tank inspections should be conducted using the checklists included in Appendix F. Results of the inspections, as well as corrective actions taken, should be recorded and maintained.

- Drums of oil should be provided with secondary containment pallets. Each containment pallet must be able to contain at least the amount of oil stored in the number of drums placed on top of it (e.g., a containment pallet holding two drums must have a capacity of at least 110 gallons).

9.2 ADDITIONAL REQUIREMENTS

The Facility must also implement the following improvements and modifications.

- The permits associated with 527 CMR 1 Section 1.12.8.50 must be obtained from the City Fire Department for ASTs 1, 2, and 11 as part of the annual renewal.

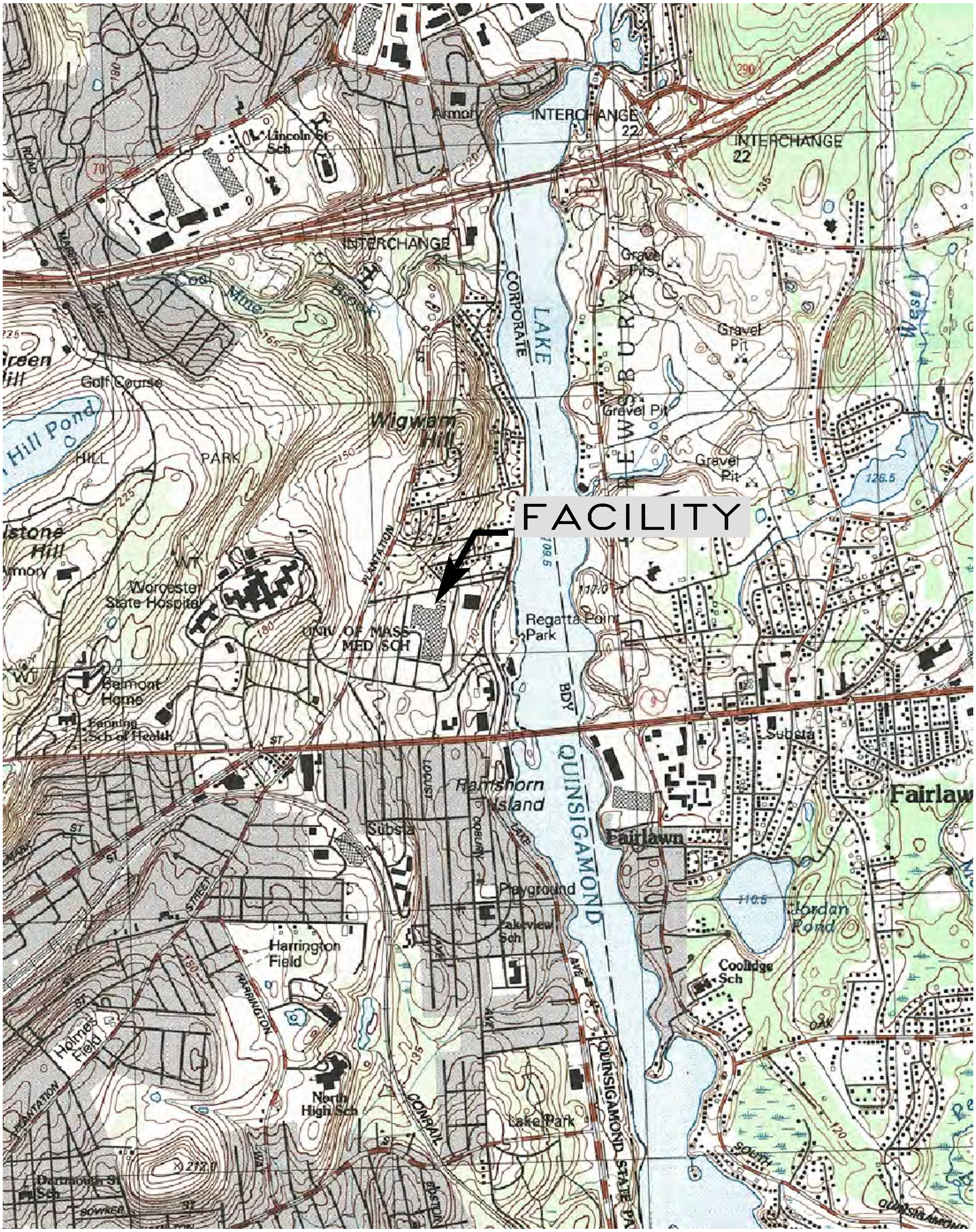
- Since the ASTs 4 through 8 located in the crypt do not meet the definition of an underground storage tank defined in 310 CMR 80.03, the ASTs are subject to the AST rule in 527 CMR 1 Section 1.12.8.40.2.2. The Facility should obtain the use and inspection permits for the five ASTs located in the crypt as required by 527 CMR 1 Section 1.12.8.40.2.2.

10.0 UNDERGROUND STORAGE TANKS

UMMS does not currently have underground storage tanks (USTs) located at the Facility. Historically, two USTs were located adjacent to the chemical bunker, which were taken out of service. As requested by the Facility, information pertaining to the USTs is included in this Section of the SPCC Plan.

The USTs were cleaned out on April 29, 2016 by Triumvirate Environmental, Inc. (Triumvirate). A report by Triumvirate from May 13, 2016 stated releases to the environment were not observed. Simpson Gumpertz & Heger, an engineering firm, recommended the USTs and associated piping be filled with concrete. Documents regarding the USTs are included in Appendix H.

FIGURES



SOURCE:

USGS WORCESTER, NORTH R,
MASSACHUSETTS
TOPOGRAPHIC QUADRANGLE DATED 1983.

CONTOUR INTERVAL: 3 METERS

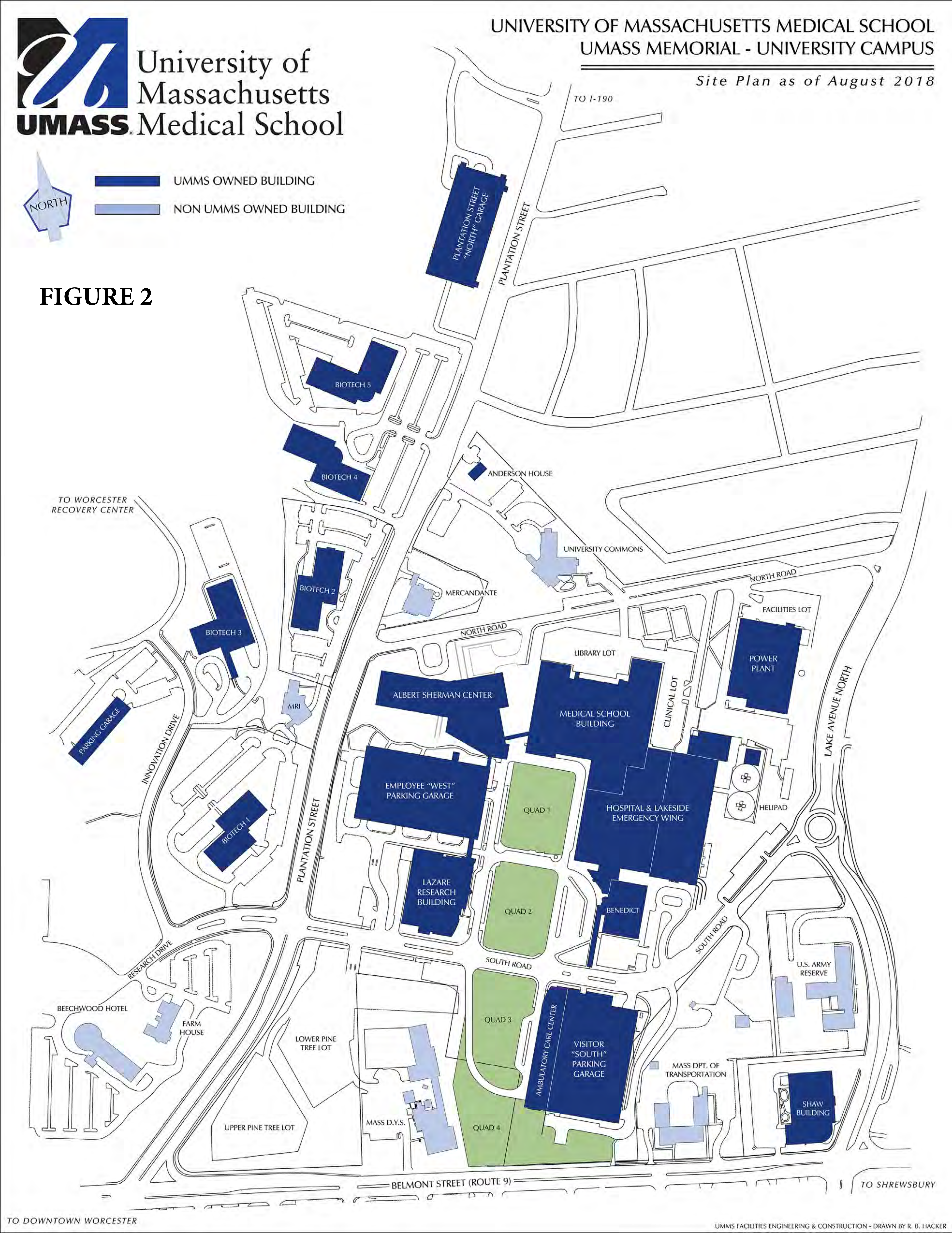
0 2000 4000

APPROX. SCALE IN FEET

CLIENT: UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL				GeoInsight Practical in Nature
PROJECT: 55 LAKE AVENUE NORTH, WORCESTER, MA				
TITLE: SITE LOCUS				
DESIGNED: SLP	DRAWN: NMT	CHECKED: SLP	APPROVED: SLP	
SCALE: 1" = 2000'	DATE: 8/2/2012	FILE NO.: 5948-LOCUS	PROJECT NO.: 5948	FIGURE NO.: 1

PLOT DATE: 8-2-12
FILE: F:\Projects\Active Projects\5948 -Umass University Hospital\figures\5948-locus.dwg

FIGURE 2



UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL
UMASS MEMORIAL - UNIVERSITY CAMPUS
Site Plan as of August 2018
University of Massachusetts Medical School
UMASS
NORTH
UMMS OWNED BUILDING
NON UMMS OWNED BUILDING
TO I-190
PLANTATION STREET "NORTH" GARAGE
PLANTATION STREET
BIOTECH 5
BIOTECH 4
ANDERSON HOUSE
TO WORCESTER RECOVERY CENTER
UNIVERSITY COMMONS
BIOTECH 2
MERCANDANTE
NORTH ROAD
FACILITIES LOT
BIOTECH 3
NORTH ROAD
LIBRARY LOT
POWER PLANT
PARKING GARAGE
MRI
ALBERT SHERMAN CENTER
MEDICAL SCHOOL BUILDING
CLINICAL LOT
LAKE AVENUE NORTH
INNOVATION DRIVE
EMPLOYEE "WEST" PARKING GARAGE
QUAD 1
HOSPITAL & LAKESIDE EMERGENCY WING
HELIPAD
BIOTECH 1
PLANTATION STREET
LAZARE RESEARCH BUILDING
QUAD 2
BENEDICT
SOUTH ROAD
RESEARCH DRIVE
SOUTH ROAD
U.S. ARMY RESERVE
BEECHWOOD HOTEL
FARM HOUSE
QUAD 3
AMBULATORY CARE CENTER
VISITOR "SOUTH" PARKING GARAGE
LOWER PINE TREE LOT
MASS DPT. OF TRANSPORTATION
SHAW BUILDING
UPPER PINE TREE LOT
MASS D.Y.S.
QUAD 4
BELMONT STREET (ROUTE 9)
TO SHREWSBURY
TO DOWNTOWN WORCESTER
UMMS FACILITIES ENGINEERING & CONSTRUCTION - DRAWN BY R. B. HACKER

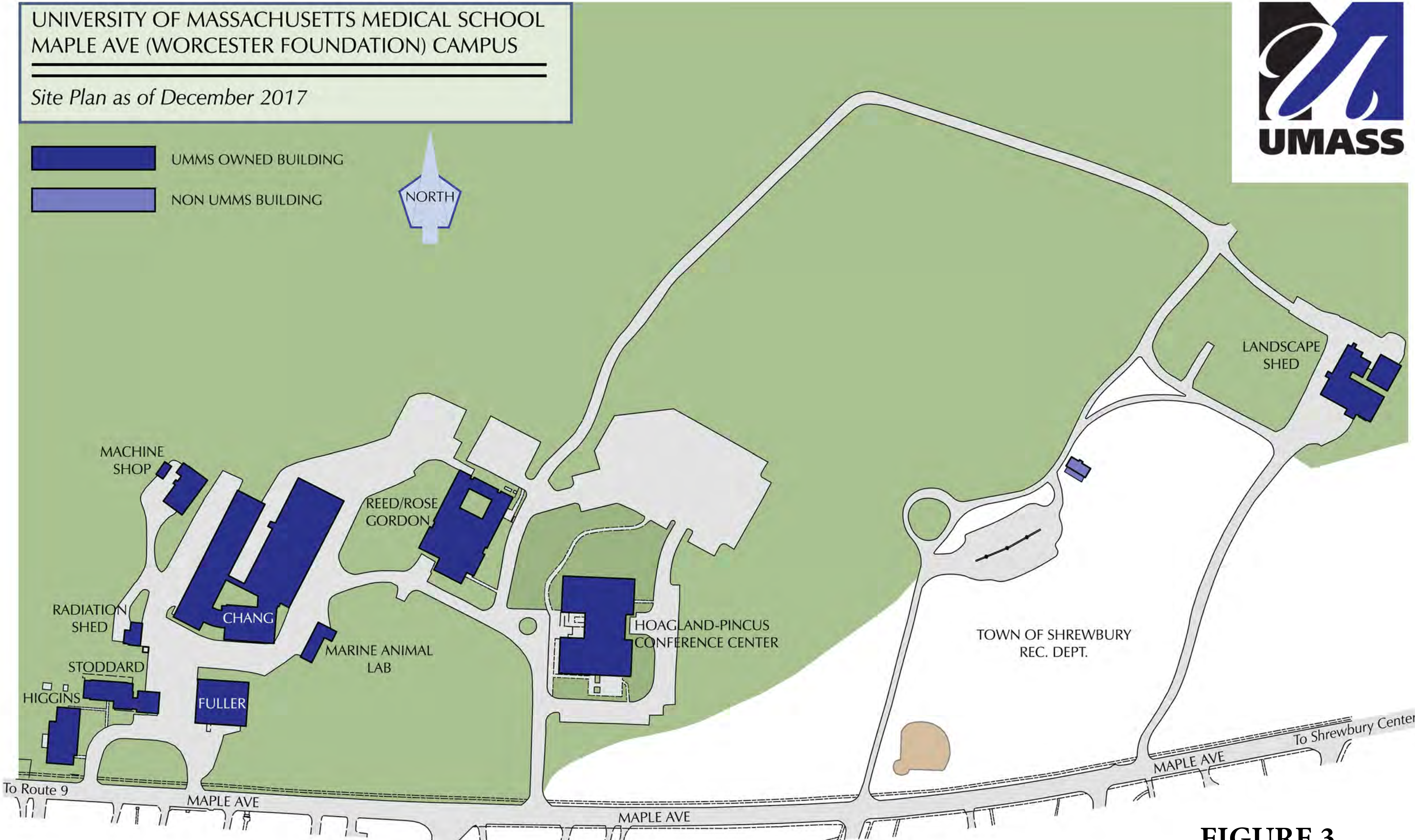
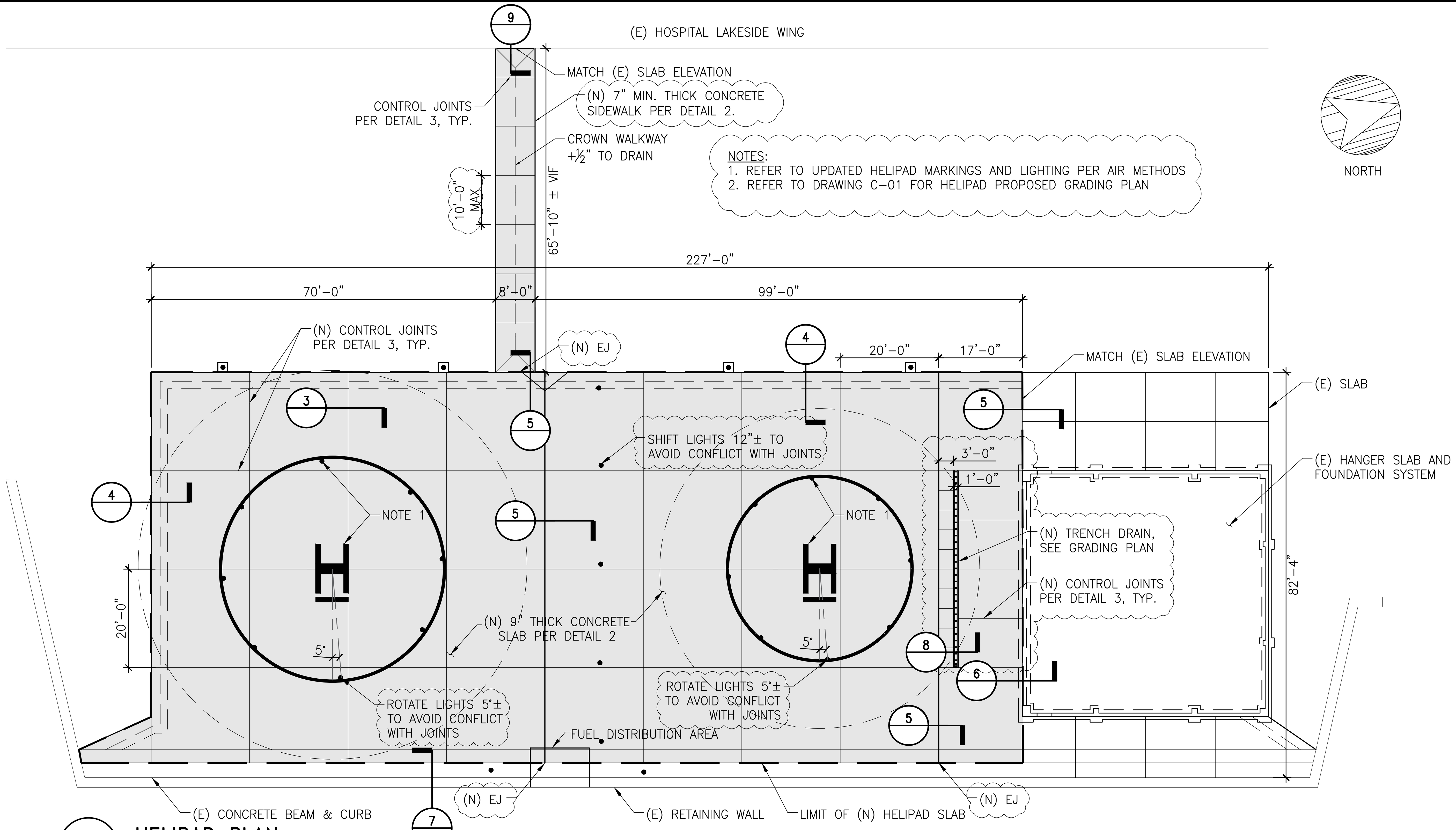


FIGURE 3

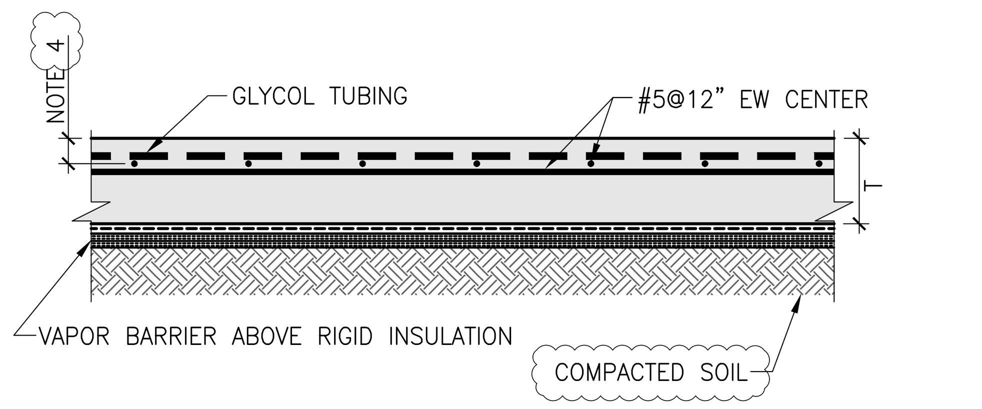
PHYSICAL CAMPUS ADDRESS: 222 MAPLE AVE, SHREWSBURY, MA

UMMS FACILITIES ENGINEERING & CONSTRUCTION | DRAWN BY L. ADAMS



1 HELIPAD PLAN

NTS

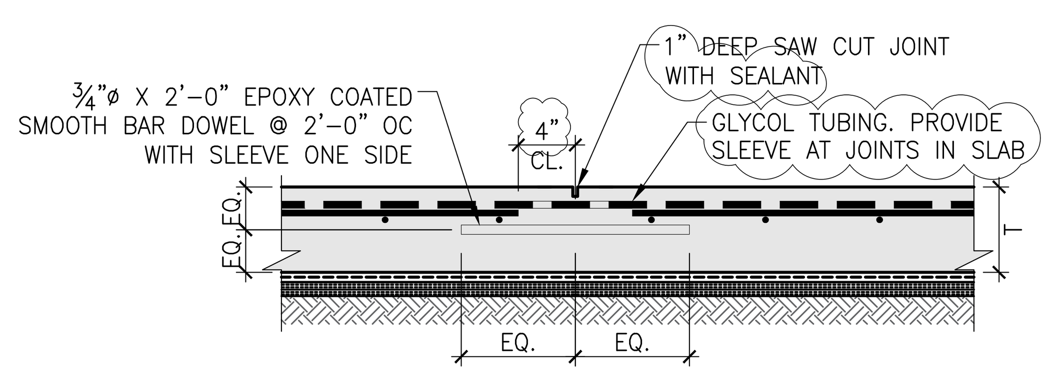


NOTES

1. REFER TO NOTES THIS SHEET FOR ADDITIONAL INFORMATION.
2. ALL SLAB REINFORCEMENT EPOXY COATED UON.
3. REFER TO PLAN FOR SLAB THICKNESS, "T".
4. LOCATE SLAB REINFORCEMENT TO PROVIDE 2" MIN. CLEAR COVER OVER GYLCOL TUBING. COORDINATE LOCATION WITH SNOWMELT SYSTEM INSTALLER.

2 TYPICAL S.O.G. SECTION

NTS

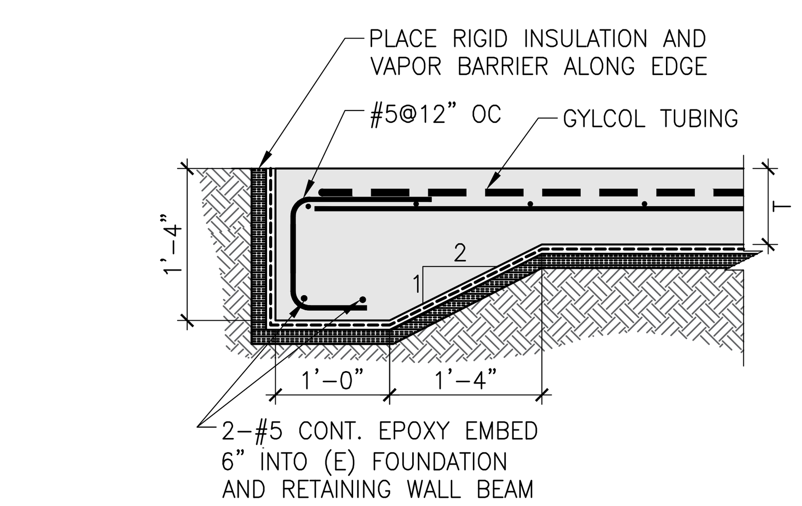


NOTES

1. REFER TO DETAIL 2 FOR TYPICAL S.O.G. CONSTRUCTION.
2. END DOWEL RUN 15" MIN. FROM TRANSVERSE JOINT.
3. SAW CUT CONTROL JOINTS AS EARLY AS POSSIBLE AFTER CONCRETE HAS SUFFICIENTLY SET TO NOT RAVEL THE EDGES.
3. PROVIDE JOINT SEALANT PRIOR TO APPLYING PENETRATING SEALER TO CONCRETE.

3 TYPICAL S.O.G. CONTROL JOINT

NTS

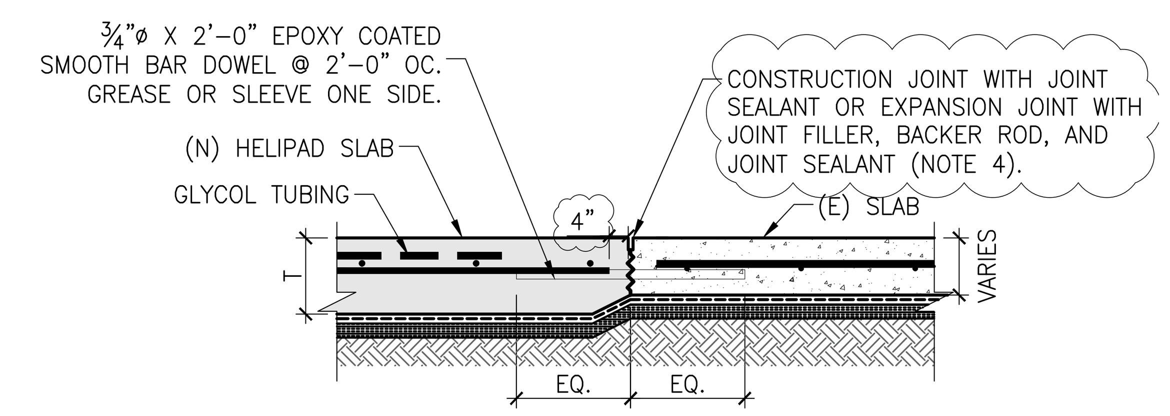


NOTES

1. REFER TO DETAIL 2 FOR TYPICAL S.O.G. CONSTRUCTION.

4 TYPICAL S.O.G. EDGE DETAIL

NTS



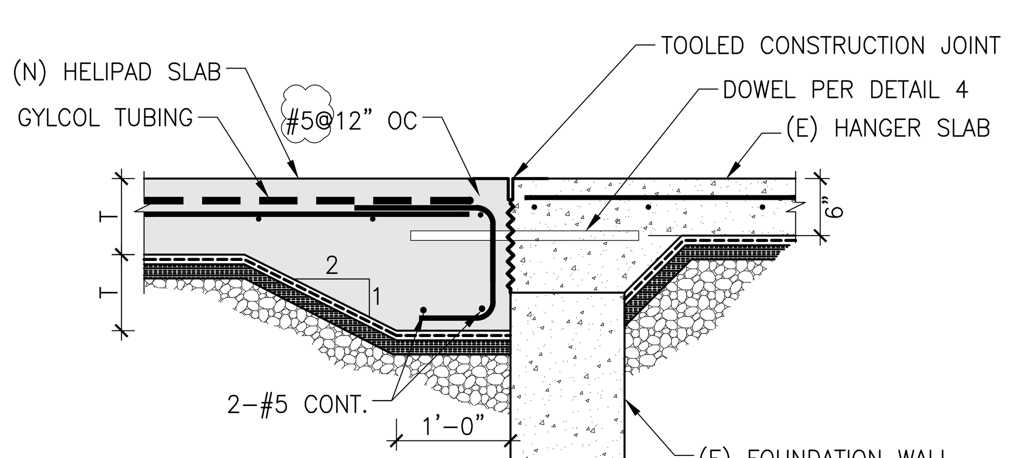
NOTES

1. REFER TO DETAIL 2 FOR TYPICAL S.O.G. CONSTRUCTION.
2. REUSE OR REPLACE (E) DOWELS AT EDGE OR DEMOLITION. END DOWEL RUN 15" MIN. FROM TRANSVERSE JOINT.
3. PROVIDE JOINT SEALANT PRIOR TO APPLYING PENETRATING SEALER TO CONCRETE.
4. FORM EXPANSION JOINTS WITH PREFORMED JOINT FILLER IN PLACE, FULL DEPTH OF SLAB. PROVIDE 1¼" DEEP SEALANT AND BACKER ROD BELOW FINISHED GRADE OF SLAB, SIMILAR TO DETAIL 9.

5 TYPICAL S.O.G. CONSTRUCTION JOINT

S.O.G. EXPANSION JOINT SIMILAR

NTS

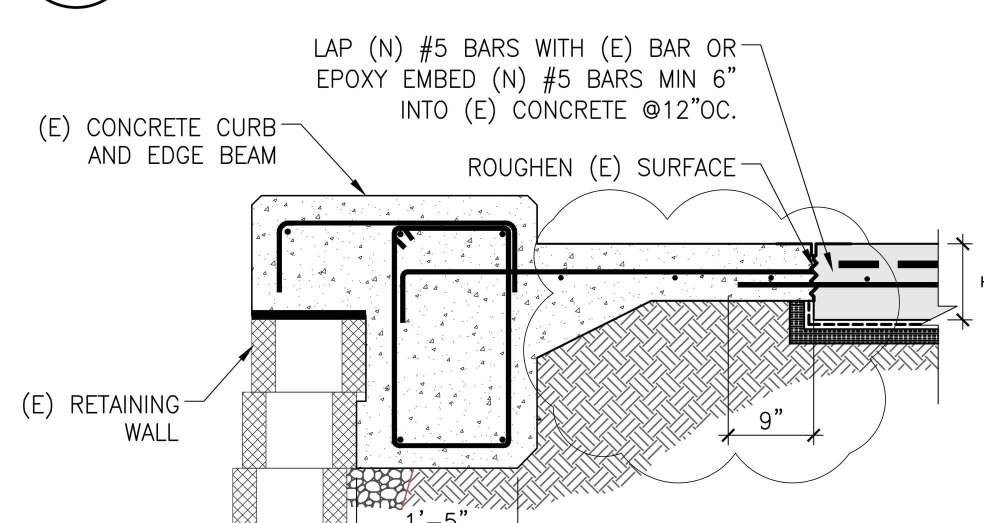


NOTES

1. REFER TO DETAIL 2 FOR TYPICAL S.O.G. CONSTRUCTION.
2. REFER TO DETAIL 5 FOR TYPICAL CONSTRUCTION JOINT DETAIL.
3. REFER TO DETAIL 4 FOR TYPICAL S.O.G. EDGE DETAIL.

6 CONSTRUCTION JOINT AT HANGER SLAB

NTS

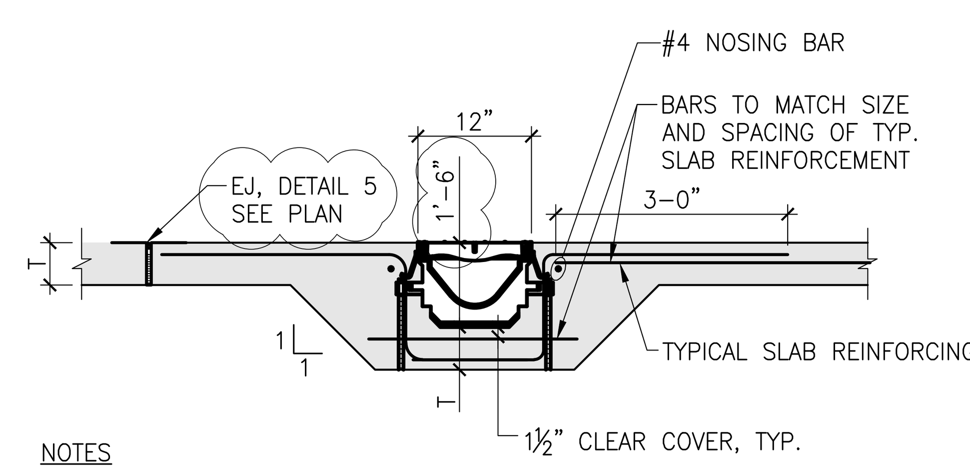


NOTES

1. REFER TO DETAIL 2 FOR TYPICAL S.O.G. CONSTRUCTION.

7 SLAB EDGE AT RETAINING WALL

NTS

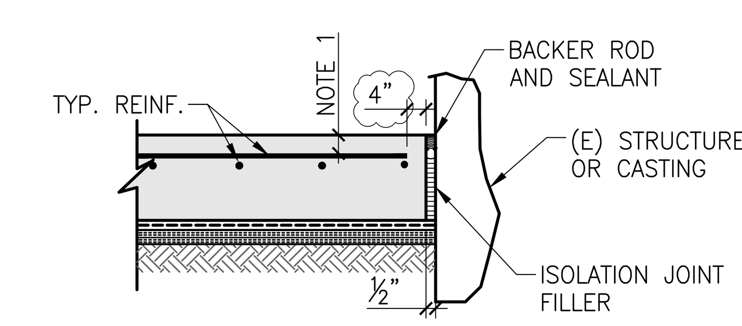


NOTES

1. DRAIN TO BE ZURN Z882 PERMA-TRENCH SYSTEM OR APPROVED EQUAL.
2. REFER TO PLAN FOR SLAB THICKNESS, "T".
3. INVERT TO BE CONFIRMED WITH TRENCH DRAIN SELECTION.

8 TRENCH DRAIN DETAIL

NTS



NOTES

1. REFER TO DETAIL 2 FOR TYPICAL S.O.G. CONSTRUCTION.

9 TYPICAL S.O.G. ISOLATION JOINT

NTS

NOTES

1. EXISTING PERIMETER FENCE (NOT SHOWN) TO REMAIN. REMOVE, STORE, AND REINSTALL IF REQUIRED FOR CONSTRUCTION.
2. BACKFILL ALL MATERIAL TO BE PLACED UNDER THE SLAB ON GRADE IN MAXIMUM OF 6" LIFTS AND COMPACTED TO 95% OF MODIFIED PROCTOR MAXIMUM DRY DENSITY PER ASTM D698 BEFORE PLACING NEXT LIFT. UNIFORMLY MOISTEN OR AERATE EACH SUBSEQUENT BACKFILL SOIL LAYER BEFORE COMPACTION TO WITHIN 2% OF OPTIMUM MOISTURE CONTENT. WHEN MOISTURE CONTENT IS EXCESSIVE, DEFER COMPACTION UNTIL THE MATERIAL HAS DRIED TO SUITABLE MOISTURE CONTENT. NATURAL DRYING MAY BE ACCELERATED BY MANIPULATION TO INCREASE THE RATE OF EVAPORATION, OR BY BLENDING SIMILAR MATERIALS FROM A DRY STOCKPILE. IF DRYING IS ACCOMPLISHED BY BLENDING IN A DRY MATERIAL, TAKE CARE NOT TO EXCEED THE SPECIFIED MAXIMUM LAYER THICKNESS FOR COMPACTION. REMOVE ANY EXCESS MATERIAL FROM THE LAYER BEFORE COMPACTION.
3. CONTRACTOR IS TO PERFORM 2 FIELD COMPACTION TESTS FOR THE COMPACTED SOIL AT EACH LANDING PAD. PROVIDE DOCUMENTATION TO EOR.
4. HELIPAD SLAB CONSTRUCTION IS 9" THICK CONCRETE SLAB ON GRADE WITH EPOXY COATED #5 @12" O.C. EACH WAY CENTER OF SLAB PER DETAIL 2. PLACE SLAB ON 10 MIL POLYETHYLENE VAPOR BARRIER ON RIGID INSULATION ON COMPACTED SOIL.
5. COORDINATE PLACEMENT OF REINFORCEMENT WITH GLYCOL SNOW MELT SYSTEM INSTALLER AND PLACEMENT OF RECESSED LIGHT FIXTURES.
6. LAP CONTINUOUS BARS 3'-0" AND TERMINATE WITH A STANDARD HOOK UON ON EDGE DETAILS.
7. MATCH TOP OF SLAB ELEVATION WITH EXISTING SLAB AT HANGER. REFER TO HELIPA PROPOSED GRADING PLAN FOR SLAB ELEVATION.
8. SLAB SURFACE FINISH TOLERANCE: FLAT CLASSIFICATION PER ACI 117 (3/16 IN PER 10 FT).
9. SURFACE FINISH: MEDIUM BROOM FINISH WITH TINE PATTERN PARALLEL WITH THE NORTH-SOUTH DIRECTION.
10. CURING: WET OR PAPER CURE FOR A MINIMUM OF 7 DAYS.
11. APPLY SEALER IN STRICT ADHERENCE TO MANUFACTURER'S INSTRUCTIONS.

MATERIALS

1. CONCRETE: NORMAL WEIGHT STONE CONCRETE
   1.1. 5,000 PSI 28-DAY COMPRESSIVE STRENGTH
   1.2. AIR ENTRAINING ADMIXTURE FOR A 6% +/- 1.5% AIR CONTENT
   1.3. MAX. WATER CEMENT RATIO = 0.4
   1.4. CALCIUM NITRATE CORROSION INHIBITOR AT A 2 GAL PER CU. YD. DOSAGE.
2. REINFORCEMENT: ASTM A 615,
   2.1. F_y = 60,000 PSI
   2.2. SHOP APPLIED FUSION-BONDED EPOXY COATING PER ASTM A 775.
3. RIGID INSULATION: 2" THICK DOW STYROFOAM HIGHLOAD 60 INSULATION OR APPROVED EQUAL
4. SILANE SEALER: 1-2306 SILANE BY DOW CORNING OR APPROVED EQUAL WITH MATCHING OR HIGHER SILANE CONTENT.
5. CURING PAPER: WATERPROOF PAPER FOR CURING FLAT SURFACES CONFORMING TO ASTM C 171.
6. JOINT SEALANT: TWO PART POLYURETHANE
   6.1. SIKAFLEX 2C
   6.2. APPROVED EQUAL
7. BACKER ROD: WITH MATERIAL, DIMENSION, AND COMPRESSIBILITY COMPATIBLE WITH JOINT SIZE AND JOINT FILLER.
8. EPOXY GROUT: HILTI HIT-HY 200 EPOXY OR APPROVED EQUAL.

ARCHITECT:

Consultant

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Engineering of Structures and Building Enclosures

Simpson Gumpertz & Heger Inc.
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main: 781.907.9000 fax: 781.907.9009
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New York
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No.	Date	Description	By
1	7/13/17	Rev. 1	NLV

UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL HELIPAD

51 LAKE AVENUE NORTH
WORCESTER, MA

Project

NEW HELIPAD PLAN

Drawing Title

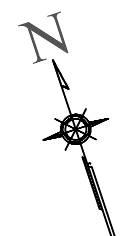
Project No.	Checked	Date
161684.00		06/05/2017
Drawn	Approved	Scale
NLV		AS NOTED

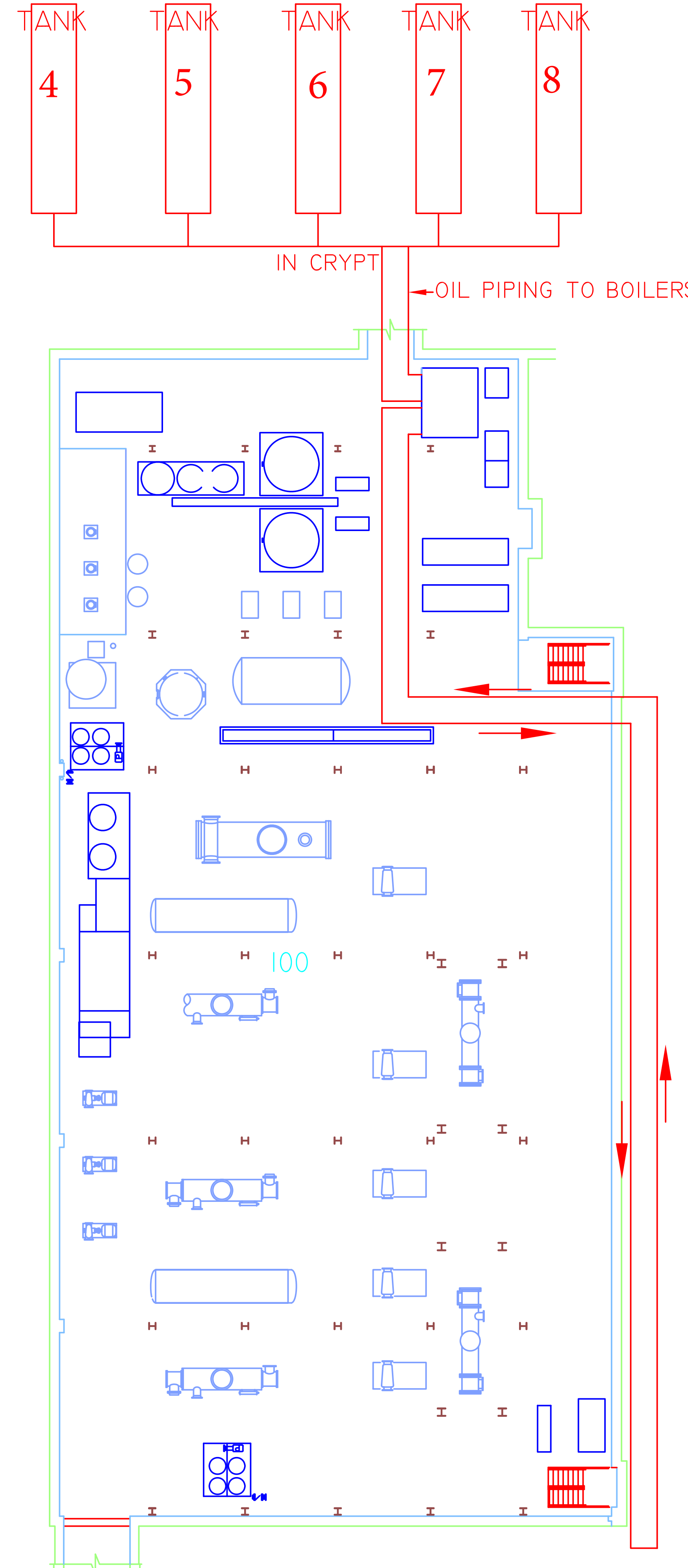
Drawing No.

S-02

Seal

IDENTIFIER / LOCATION REFERENCE ON FACILITY PLAN	DESCRIPTION	LOCATION	CAPACITY (Gallons)	CONTENTS	CONSTRUCTION	SECONDARY CONTAINMENT	SECONDARY CONTAINMENT CAPACITY (Gallons)
Tank 4	Aboveground Storage Tank	Crypt / Power Plant	84,000	#2 or #6 Fuel Oil	Single Wall Steel	Concrete Vault	84,000
Tank 5	Aboveground Storage Tank	Crypt / Power Plant	84,000	#2 or #6 Fuel Oil	Single Wall Steel	Concrete Vault	84,000
Tank 6	Aboveground Storage Tank	Crypt / Power Plant	84,000	#2 or #6 Fuel Oil	Single Wall Steel	Concrete Vault	84,000
Tank 7	Aboveground Storage Tank	Crypt / Power Plant	84,000	#2 or #6 Fuel Oil	Single Wall Steel	Concrete Vault	84,000
Tank 8	Aboveground Storage Tank	Crypt / Power Plant	84,000	#2 or #6 Fuel Oil	Single Wall Steel	Concrete Vault	84,000





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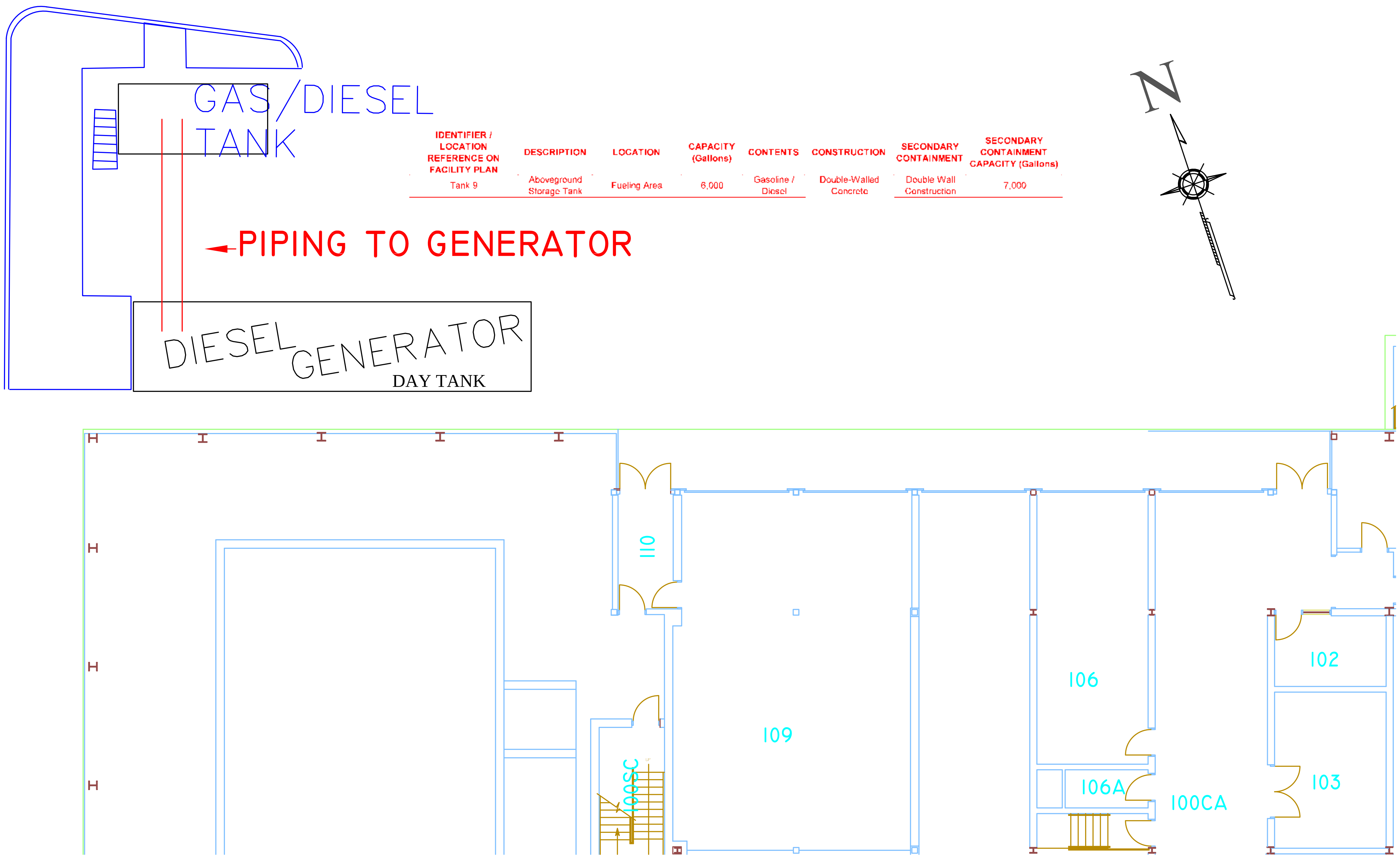
UNIV. OF MASS. MEDICAL CENTER CAMPUS
POWER PLANT
LEVEL B

SPCCP

REVISIONS		
MARK	DATE	ISSUE

DATE	1/1/07
DRAWN BY	AND
DESIGNED BY	AND
CHECKED BY	AND
APPROVED BY	PJH
SCALE	NA
PROJECT NO.	246-2006

P-1



IDENTIFIER / LOCATION REFERENCE ON FACILITY PLAN	DESCRIPTION	LOCATION	CAPACITY (Gallons)	CONTENTS	CONSTRUCTION	SECONDARY CONTAINMENT	SECONDARY CONTAINMENT CAPACITY (Gallons)
Tank 9	Aboveground Storage Tank	Fueling Area	6,000	Gasoline / Diesel	Double-Walled Concrete	Double Wall Construction	7,000

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GAS / DIESEL TANKS

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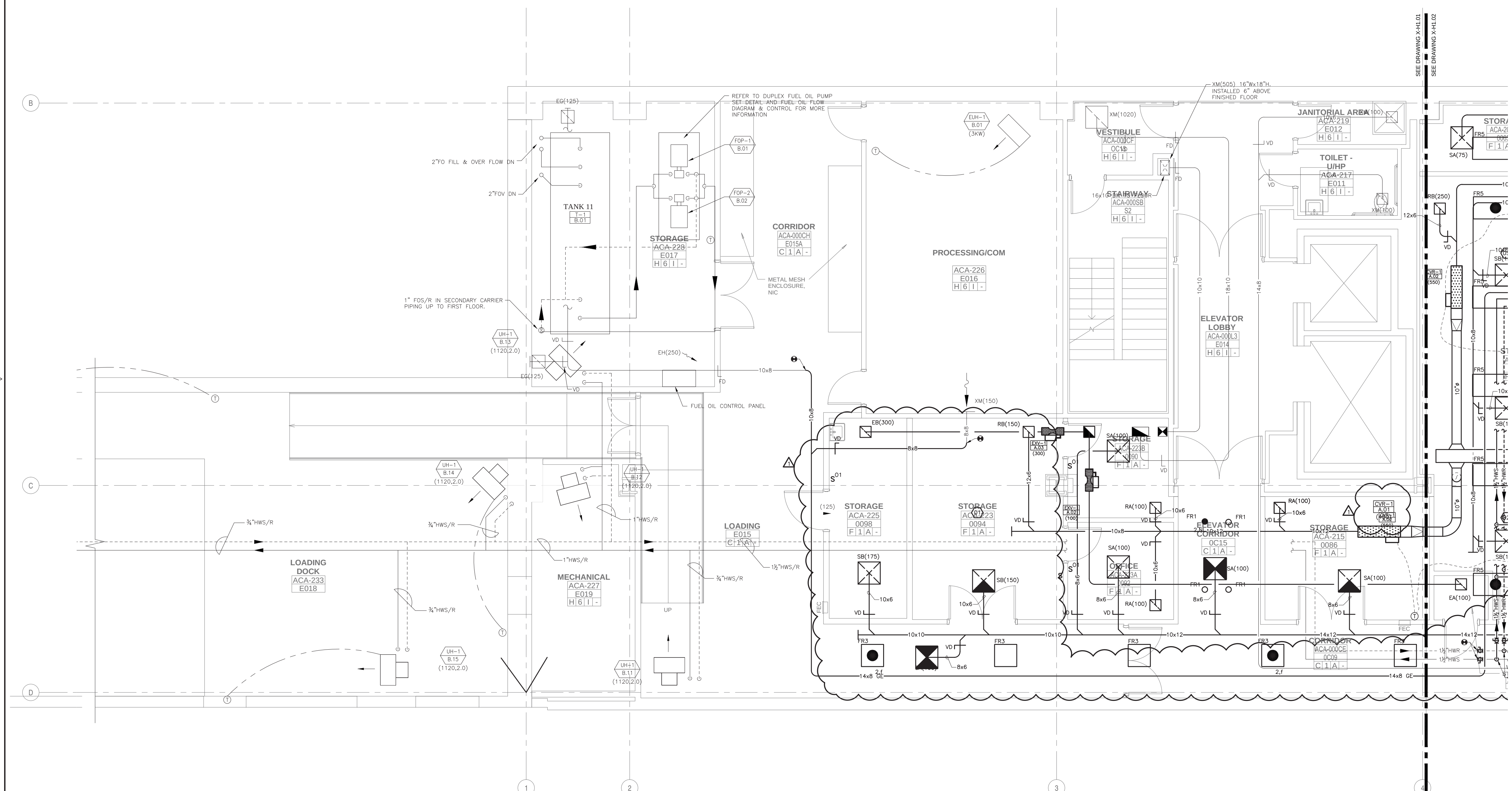
PROJECT NO.	246-2006

P-3



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RDK Engineers
200 Brickstone Square
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Fax: 978-475-5768

CONSIGLI
Est. 1905
Record Drawing
Feb 2013

Number	Date	Description
2	09/23/11	Issued As Record Drawing
1	05/29/09	Issued For ASI X-009

A B C D

N

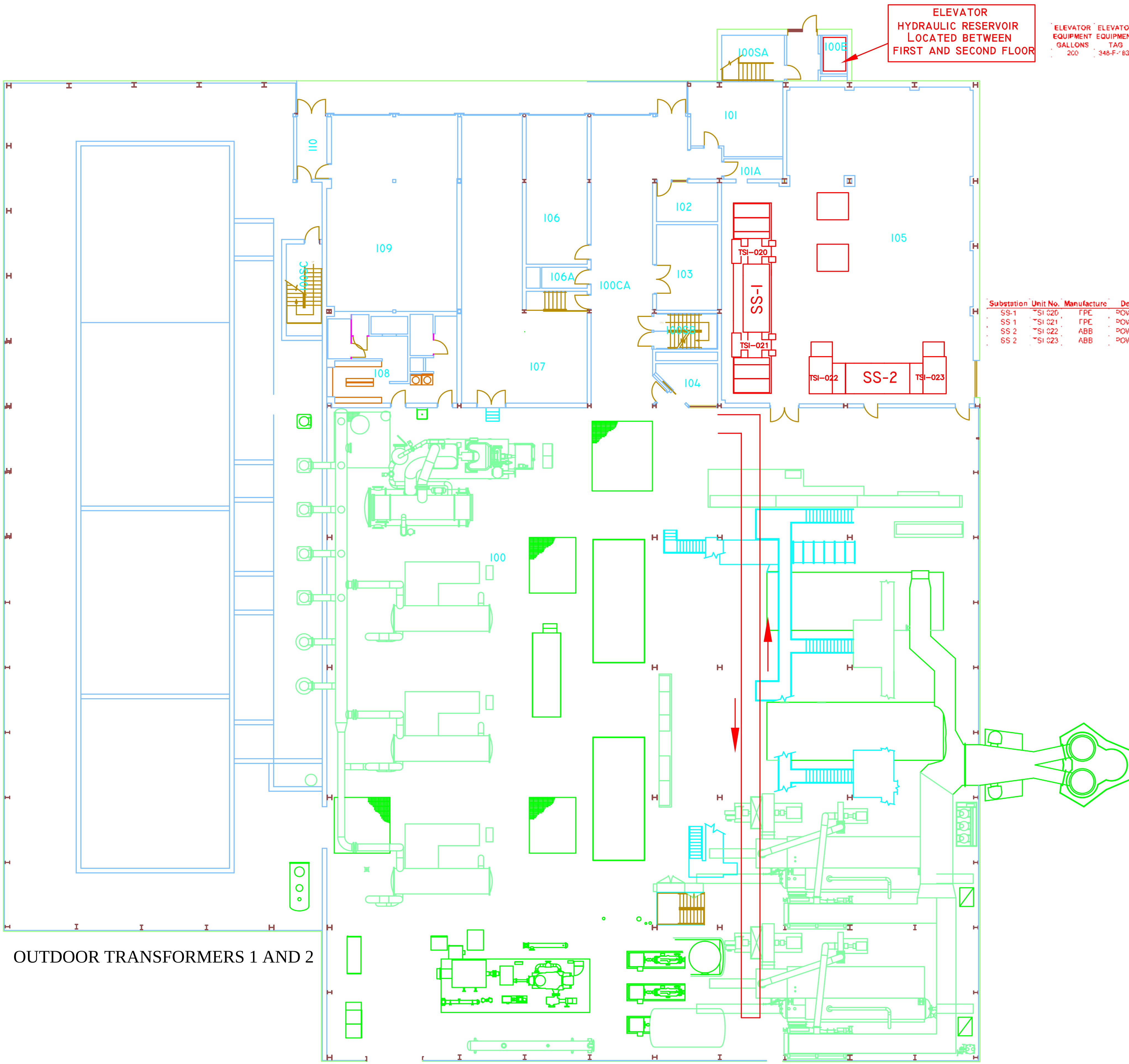
RECORD DRAWING

UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL
Advanced Center for Clinical Education and Science
UNIVERSITY CAMPUS
LEVEL A

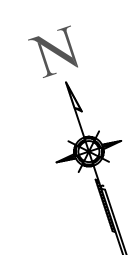
HVAC LEVEL A
FLOOR PLAN
SECTOR 'A'

Drawing Scale
1/4"=1'-0"
Project No.
42253.60
Date Issued
03/09/09

X-H1.01



Substation	Unit No.	Manufacture	Designation	Location	Inspection Date	KVA	High Voltage	Low Voltage	Phase/Cycle	Fluid Type	Fluid Gallons	Comments
SS-1	TSI 020	FPE	POWER PLANT	First Floor	December 02	2.500	13.800	480/277	3/60	SILICONE	441	
SS 1	TSI 021	FPE	POWER PLANT	First Floor	December 02	2.500	13.800	480/277	3/60	SILICONE	441	
SS 2	TSI 022	ABB	POWER PLANT	First Floor	December 02	3.000	13.800	4160	3/60	DRY	N/A	DRY TYPE
SS 2	TSI 023	ABB	POWER PLANT	First Floor	December 02	3.000	13.800	4160	3/60	DRY	N/A	DRY TYPE



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POWER PLANT

FIRST FLOOR

SPCCP

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P-2

PLANTING NOTES

1. BASE PLAN PROVIDED BY ARCHITECTURAL RESOURCES CAMBRIDGE AND VHB, MAY 2011.
2. THE LOCATIONS OF UNDERGROUND UTILITIES SHOWN ARE BASED ON THE SURVEY REFERENCED ABOVE. THE CONTRACTOR SHALL CONTACT DIGSAFE AND THE PROPER LOCAL AUTHORITIES OR RESPECTIVE UTILITY COMPANIES TO CONFIRM THE LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. ANY DAMAGE DUE TO FAILURE OF THE CONTRACTOR TO CONTACT THE PROPER AUTHORITIES SHALL BE BORNE BY THE CONTRACTOR.
3. CONTRACTOR SHALL BEGIN MAINTENANCE IMMEDIATELY AFTER PLANTING AND WILL CONTINUE UNTIL FINAL WRITTEN ACCEPTANCE OF PLANT MATERIAL.
4. LANDSCAPE ARCHITECT TO FLAG ALL TREES TO BE TRANSPLANTED PRIOR TO CONSTRUCTION START.
5. CONTRACTOR SHALL VERIFY ALL TREE REMOVALS AND/OR TRANSPLANTS WITH OWNER'S REPRESENTATIVE PRIOR TO CONSTRUCTION START.
6. CONTRACTOR SHALL MAINTAIN POSITIVE DRAINAGE AWAY FROM ALL BUILDING FOUNDATIONS, STRUCTURES, AND PLANTING BEDS.
7. THE LANDSCAPE CONTRACTOR SHALL SUPPLY ALL PLANT MATERIALS IN QUANTITIES SUFFICIENT TO COMPLETE ALL PLANTINGS SHOWN ON THIS DRAWING.
8. ALL MATERIALS SHALL CONFORM TO THE GUIDELINES ESTABLISHED BY THE AMERICAN NURSERY AND LANDSCAPE ASSOCIATION.
9. ALL PLANTS SHALL BEAR THE SAME RELATIONSHIP TO FINISH GRADE AS TO ORIGINAL GRADES BEFORE DIGGING.
10. ALL PLANTS TO BE BALLED IN BURLAP OR CONTAINERIZED.
11. MULCH FOR PLANTED AREAS TO BE AGED PINE BARK: PARTIALLY DECOMPOSED, DARK BROWN IN COLOR AND FREE OF WOOD CHIPS THICKER THAN 1/4 INCH.
12. PLANTING SOIL MIX: LOAM THOROUGHLY INCORPORATED WITH ROTTED MANURE PROPORTIONED 5 C.Y. TO 1 C.Y. OR EQUIVALENT. FERTILIZER ADDED PER RECOMMENDED RATES OF SOILS ANALYSIS.
13. THE LANDSCAPE CONTRACTOR SHALL GUARANTEE ALL PLANT MATERIALS FOR ONE (1) FULL YEAR FROM DATE OF ACCEPTANCE.
14. ALL PLANT MATERIALS ARE SUBJECT TO THE APPROVAL OF THE LANDSCAPE ARCHITECT, AT THE NURSERY, AND AT THE SITE.
15. ALL AREAS OF THE SITE WHICH HAVE BEEN DISTURBED AND NOT OTHERWISE DEVELOPED SHALL BE LOAMED AND SEEDED WITH A MINIMUM DEPTH OF 6" DEPTH TOPSOIL.
16. PLANT SIZE AND QUANTITY SHALL NOT CHANGE WITHOUT APPROVAL OF OWNER'S REPRESENTATIVE.

PLANT SCHEDULE

SYMBOL	BOTANICAL NAME	COMMON NAME	QTY	SIZE	COMMENT
DECIDUOUS TREES					
AC	AMELANCHIER CANADENSIS	SERVICEBERRY	9	8' – 10' HT.	
CB	CARPINUS BETULUS 'FASTIGIATA'	PYRAMIDAL EUROPEAN HARNBEAM	12	3 – 3 1/2" CAL.	
LT	LIRIODENDRON TULIPIFERA	TULIPTREE	7	3 – 3 1/2" CAL.	
SHRUBS					
IJ	ITEA JAPONICA	SWEETSPIRE	16	24–30"	
TB	TAXUS BACCATA 'REPANDENS'	SPREADING ENGLISH YEW	46	24–30"	
PERENNIALS					
AR	ASTILBE CHINENSIS 'RED SENTINEL'	RED SENTINEL ASTILBE	170	#2 POT	
DE	DRYOPTERIS ERYTHROSORA	AUTUMN FERN	170	#2 POT	
HB	HEMEROCALLIS x 'BLACK EYED SUSAN'	BLACK EYED SUSAN DAYLILY	35	#2 POT	
VM	VINCA MINOR	PERIWINKLE	168	FLAT OF 24	

LAWN MIX

	PERENNIAL RYEGRASS	40%
	CHEWINGS FESCUE	30%
	KENTUCKY BLUEGRASS	30%
		100%

APPLICATION RATE: 8lb./1,000 s.f.

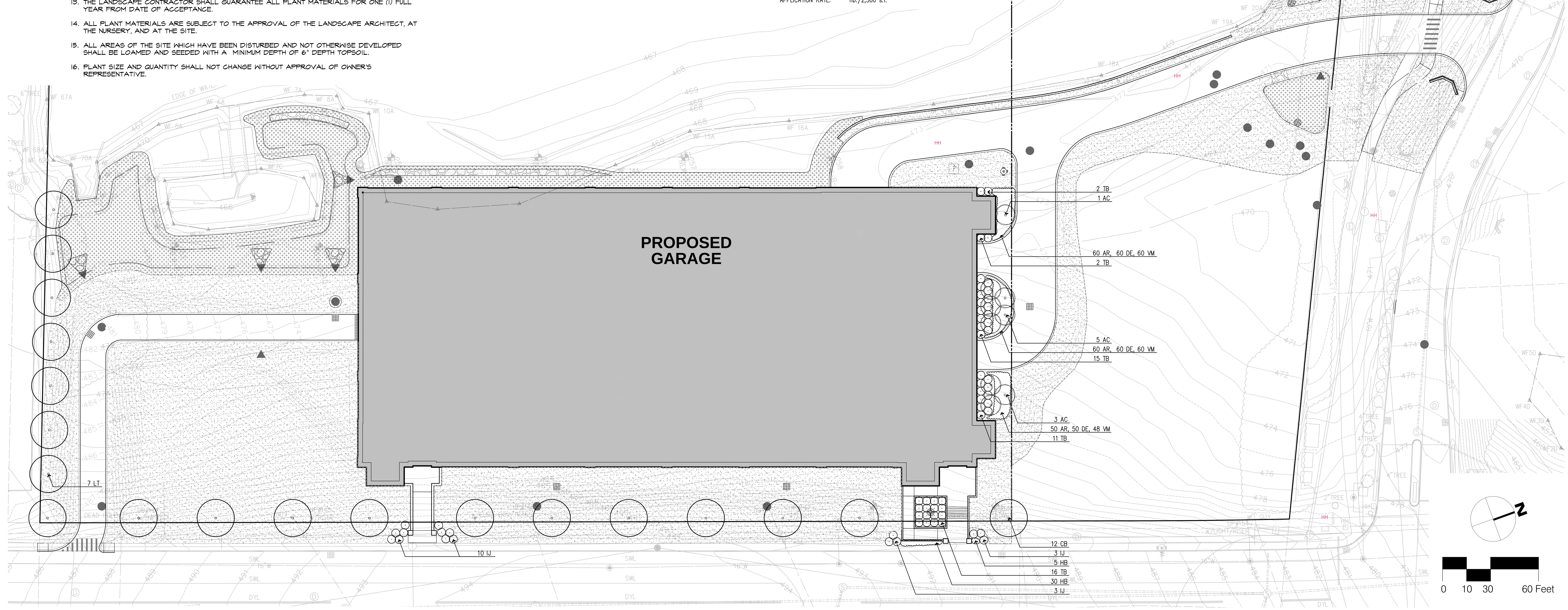
WETLAND SEED MIX

	NEW ENGLAND WETMIX (WETLAND SEED MIX) BY: NEW ENGLAND WETLAND PLANTS 820 WEST STREET AMHERST, MA 01002 (413)-548-8000

APPLICATION RATE: 1lb./2,500 s.f.

PROPOSED LEGEND

- PROPERTY LINE
- LAWN
- NEW ENGLAND WETLAND SEED MIX
- GROUND COVER / PERENNIAL PLANTING
- SHRUB PLANTING
- ORNAMENTAL TREE
- DECIDUOUS TREE



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DESMAN ASSOCIATES
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Land Development
Environmental Services
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Watertown, Massachusetts 02471
617.924.1770 • FAX 617.924.2286
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RWS
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WORCESTER, MA

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Tel. 617.523.8103
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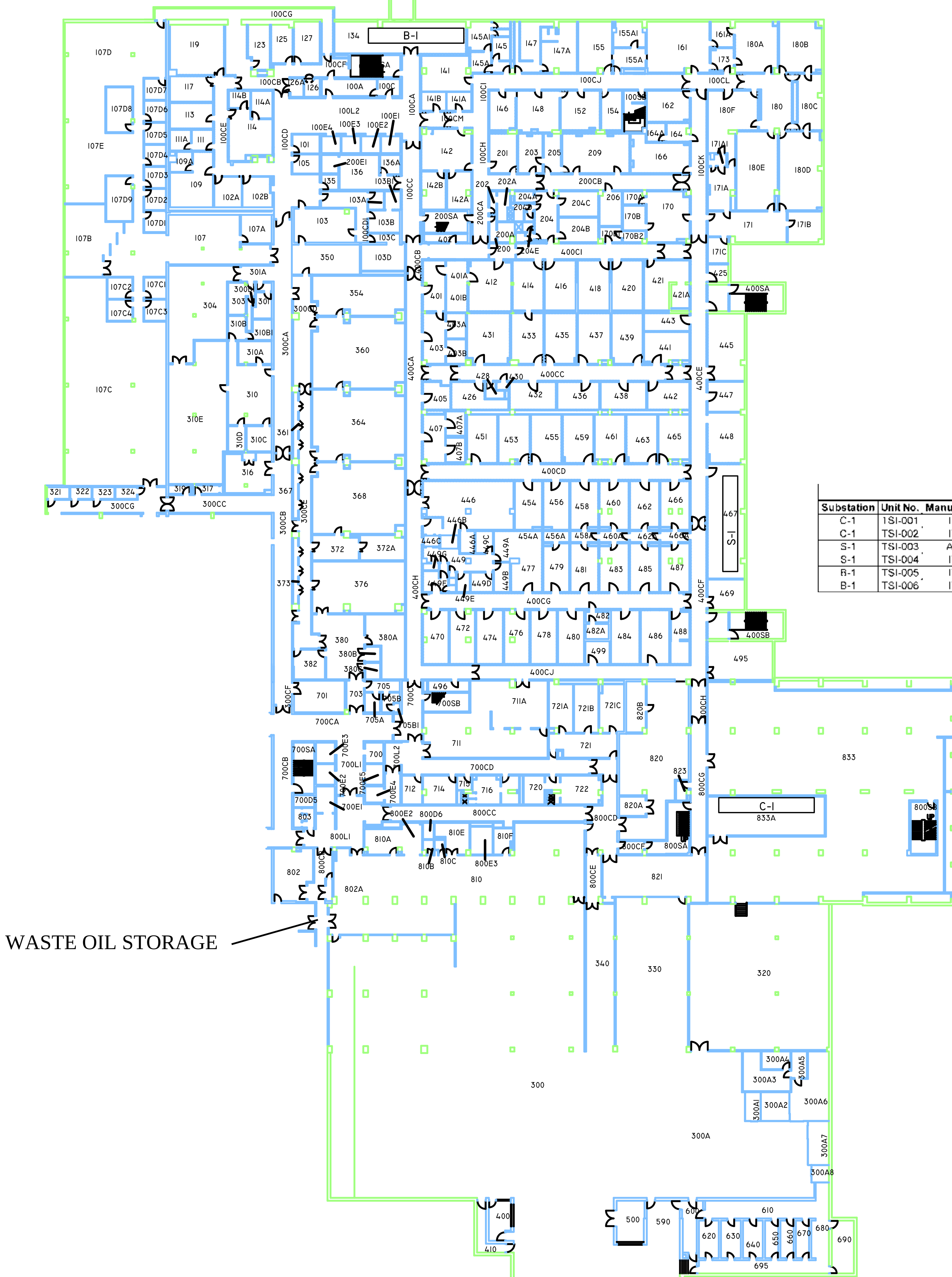
PLANTING PLAN

CPR - G013 R1 LANDSCAPE

L-1.0.01

NO.	REVISION	DATE
1	CPR G-020	07/23/2012

SCALE: 1" = 30'-0"
JOB NO: 210800445
DATE: 06.21.2012
DRAWN BY: MN
FILE NAME: 210800445-P.dwg



Transformer Data Sheet

Substation	Unit No.	Manufacture	Designation	Location	Inspection Date	KVA	High Voltage	Low Voltage	Phase/Cycle	Fluid Type	Fluid Gallons	Comments
C-1	TSI-001	ITE	CLINICAL 1	School Level A	December-02	2.500	13,800	480/277	3/60	SILICONE	320	
C-1	TSI-002	ITE	CLINICAL 1	School Level A	December-02	2.500	13,800	480/277	3/60	SILICONE	230	
S-1	TSI-003	ABB	STUDENT LAB 1	School Level A	December-02	2.500	13,800	480Y/277	3/60	DRY	N/A	DRY TYPE
S-1	TSI-004	ITE	STUDENT LAB 1	School Level A	December-02	2.500	13,800	480/277	3/60	SILICONE	320	
B-1	TSI-005	ITE	BASIC #1	School Level A	December-02	2.500	13,800	480Y/277	3/60	SILICONE	320	
B-1	TSI-006	ITE	BASIC #1	School Level A	December-02	2.500	13,800	480Y/277	3/60	SILICONE	320	

N

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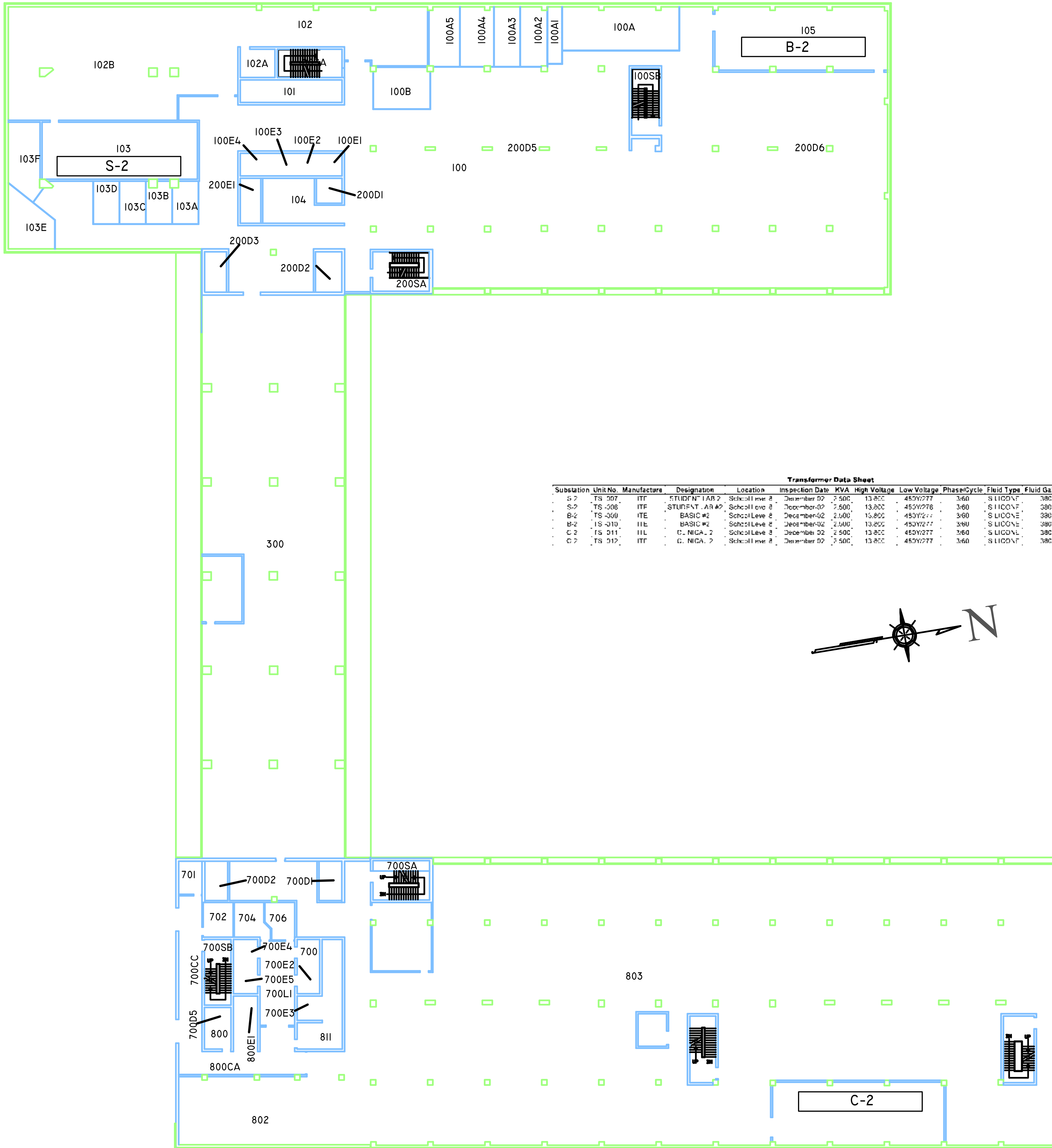
PROJECT NO.	246-2006

S-2



Transformer Data Sheet

Substation	Unit No.	Manufacture	Designation	Location	Inspection Date	KVA	High Voltage	Low Voltage	Phase/Cycle	Fluid Type	Fluid Gallons	Comments
S-2	TS -007	ITE	STUDENT LAB 2	School Level 8	December-02	2,500	13,800	480Y/277	3/60	SILICONE	380	
S-2	TS -008	ITE	STUDENT LAB #2	School Level 8	December-02	2,500	13,800	480Y/278	3/60	SILICONE	380	
B-2	TS -009	ITE	BASIC #2	School Level 8	December-02	2,500	13,800	480Y/277	3/60	SILICONE	380	
B-2	TS -010	ITE	BASIC #2	School Level 8	December-02	2,500	13,800	480Y/277	3/60	SILICONE	380	
C-2	TS -011	ITE	CLINICAL 2	School Level 8	December-02	2,500	13,800	480Y/277	3/60	SILICONE	380	
C-2	TS -012	ITE	CLINICAL 2	School Level 8	December-02	2,500	13,800	480Y/277	3/60	SILICONE	380	

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EIGHTH FLOOR

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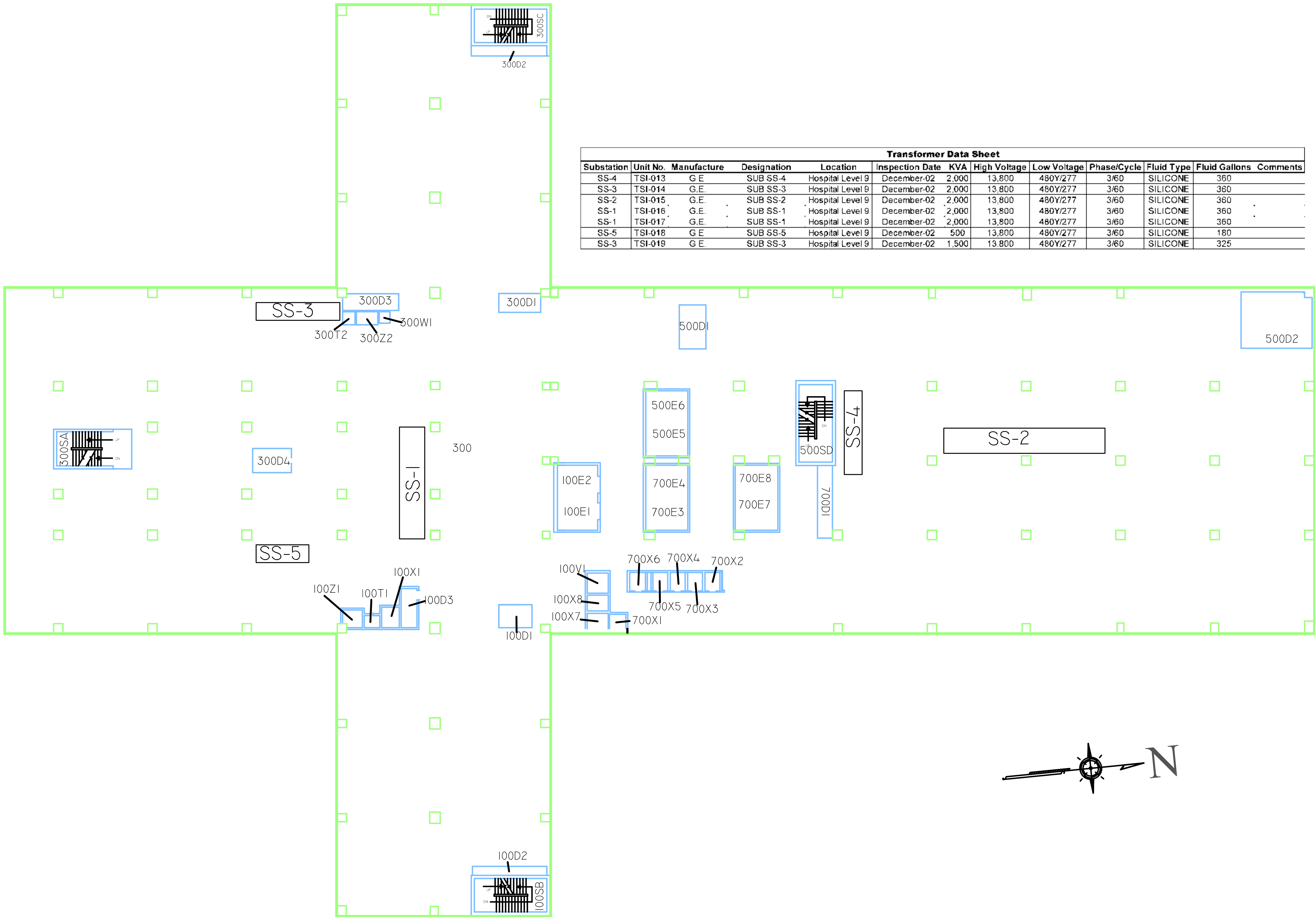
S-3



Transformer Data Sheet												
Substation	Unit No.	Manufacture	Designation	Location	Inspection Date	KVA	High Voltage	Low Voltage	Phase/Cycle	Fluid Type	Fluid Gallons	Comments
SS-4	TSI-013	G E	SUB SS-4	Hospital Level 9	December-02	2,000	13,800	480Y/277	3/60	SILICONE	360	
SS-3	TSI-014	G.E.	SUB SS-3	Hospital Level 9	December-02	2,000	13,800	480Y/277	3/60	SILICONE	360	
SS-2	TSI-015	G.E.	SUB SS-2	Hospital Level 9	December-02	2,000	13,800	480Y/277	3/60	SILICONE	360	
SS-1	TSI-016	G.E.	SUB SS-1	Hospital Level 9	December-02	2,000	13,800	480Y/277	3/60	SILICONE	360	
SS-1	TSI-017	G.E.	SUB SS-1	Hospital Level 9	December-02	2,000	13,800	480Y/277	3/60	SILICONE	360	
SS-5	TSI-018	G E	SUB SS-5	Hospital Level 9	December-02	500	13,800	480Y/277	3/60	SILICONE	180	
SS-3	TSI-019	G E.	SUB SS-3	Hospital Level 9	December-02	1,500	13,800	480Y/277	3/60	SILICONE	325	

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PROJECT NO.	246-2006

H-2

BRANCH CIRCUIT WIRING LEGEND	
A	2#10 & 1#10 GROUND – 3/4" CONDUIT
B	4#10 & 1#10 GROUND – 3/4" CONDUIT
C	6#10 & 1#10 GROUND – 3/4"CONDUIT

POWER NOTES:

1. REFER TO DRAWING X–E0.01 FOR LEGEND, SYMBOLS AND GENERAL NOTES. REFER TO NURSE CALL SYSTEM WIRING SCHEMATIC ON DRAWING X–E6.01 FOR ADDITIONAL INFORMATION.

2. REFER TO ARCHITECTURAL DRAWINGS FOR ASSOCIATED NOTES, MOUNTING DETAILS, HEIGHTS AND EXACT LOCATIONS OF ALL DEVICES.

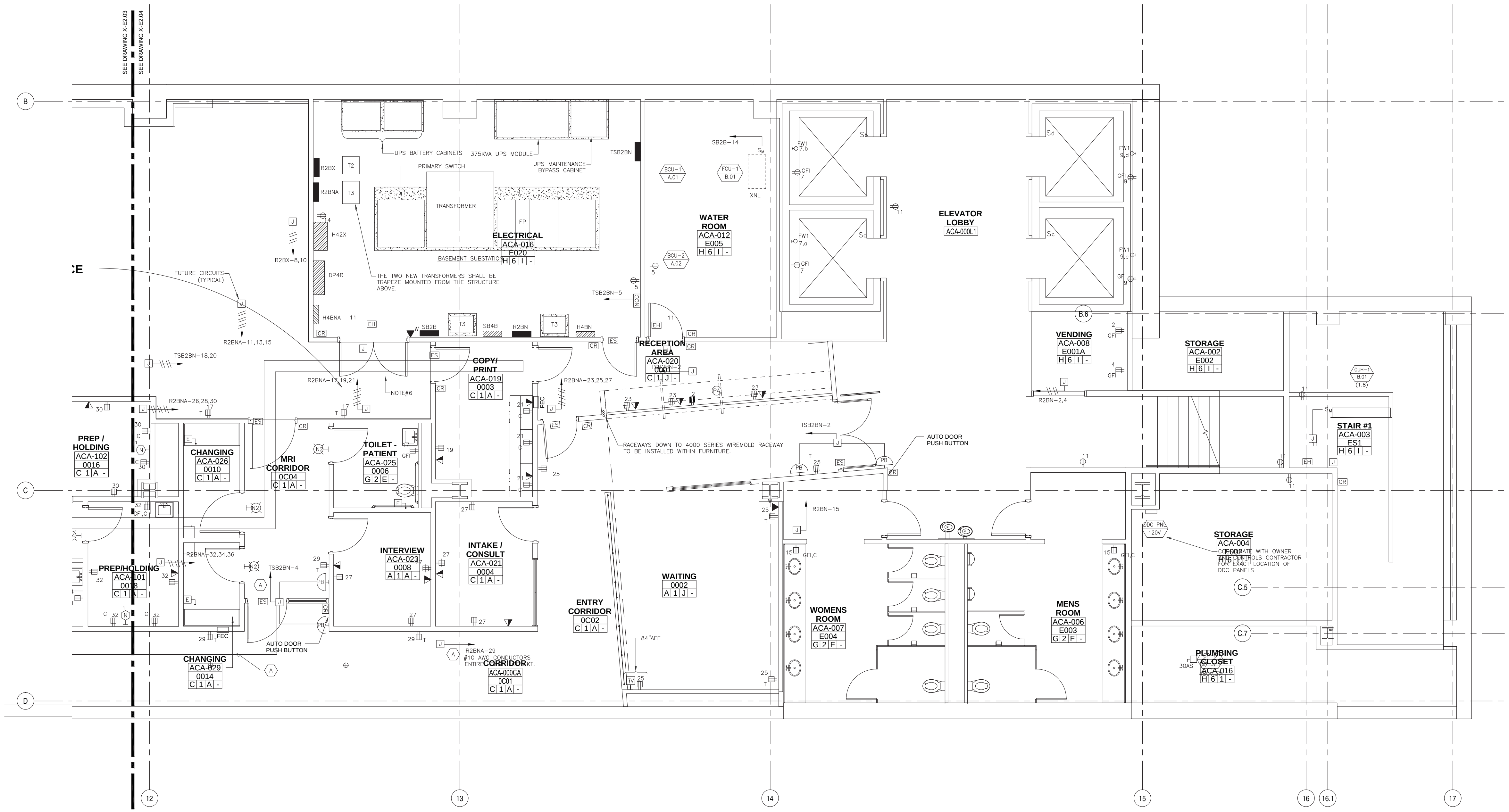
3. VOLTAGE DROP HAS BEEN CONSIDERED IN THE DESIGN OF ALL BRANCH CIRCUITRY AND FEEDER SIZES BASED UPON THE ILLUSTRATED EQUIPMENT LAYOUTS AND SHORTEST CONDUCTOR/RACEWAY ROUTING. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR DEVIATIONS TAKEN THAT WILL INCREASE CONDUCTOR/RACEWAY ROUTING LENGTHS. BRANCH CIRCUITS LONGER THAN 75' FOR 120V FROM PANEL TO LAST OUTLET SHALL BE INCREASED A MINIMUM OF ONE SIZE ABOVE THAT SPECIFIED TO LIMIT VOLTAGE DROP TO LESS THAN 3%. FEEDERS SHALL FOLLOW SIMILAR GUIDELINES AND BE LIMITED TO 2% DROP.

4. POWER BRANCH CIRCUITRY SHALL BE INSTALLED IN CONDUIT FROM THE PANEL TO THE FIRST DEVICE AND/OR WHERE EXPOSED. POWER BRANCH CIRCUITRY MAY BE TYPE MC CABLE WHERE CONCEALED ABOVE SUSPENDED CEILINGS AND IN METAL STUD WALLS IN NON–PATIENT CARE AREAS AND HOSPITAL GRADE TYPE AC CABLE FOR PATIENT CARE AREAS.

5. MAINTAIN/RECONNECT CONTINUITY OF BRANCH CIRCUITRY ASSOCIATED WITH ALL EXISTING POWER DEVICES TO REMAIN.

6. 12",18" or 24" WIDE x 4"DEEP CABLE TRAY FOR TELE/DATA WIRING. COORDINATE WITH MECHANICAL CONTRACTOR FOR EXTENDING THE DUCTWORK SUPPORTS BELOW THE DUCTWORK TO ALSO SUPPORT THE CABLE TRAY LOCATED BELOW THE DUCTWORK. CABOFIL "EZ–TRAY" OR APPROVED EQUAL.

7. PROVIDE A SERIES 22 EZ–PATH SYSTEM FIRE RATED PATHWAY BETWEEN ALL FLOOR TO STRUCTURE WALLS FOR INSTALLATION OF DATA/VOICE CABLING FOR THE CURRENT PLAN AND FOR FUTURE CABLE INSTALLATIONS.



Design Builder

Consigli Construction Company, Inc.
72 Sumner Street
Milford, MA 01757
Tel: 508-473-2580
Fax: 508-473-3588

Architect

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Tel: 617-895-1000
Fax: 617-895-1002

Civil Engineer

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Structural Engineer

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MEP/FP Engineer

RDK Engineers
200 Brickstone Square
Andover, MA 01810-1488
Tel: 978-475-0298
Fax: 978-475-5768

CONSIGLI
Record Drawing
Feb 2013

Number	Date	Description
6	09/23/11	Issued As Record Drawing
5	12/11/09	Issued For ASI X-045
4	10/16/09	Issued For ASI X-039
3	08/26/09	Issued For ASI X-030
2	05/29/09	Issued For ASI X-009
1	04/06/09	Issued For ASI X-005

RECORD DRAWING

UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL
Advanced Center for Clinical Education and Science
UNIVERSITY CAMPUS

LEVEL A

ELECTRICAL LEVEL A FLOOR PLAN - POWER SECTOR 'D'

Drawing Scale
1/4"=1'-0"

Project No.
42253.60

Date Issued
03/09/09

X-E2.04

POWER NOTES:

1. REFER TO DRAWING X-E0.01 FOR LEGEND, SYMBOLS AND GENERAL NOTES.

2. REFER TO ARCHITECTURAL DRAWINGS FOR ASSOCIATED NOTES, MOUNTING DETAILS, HEIGHTS AND EXACT LOCATIONS OF ALL DEVICES.

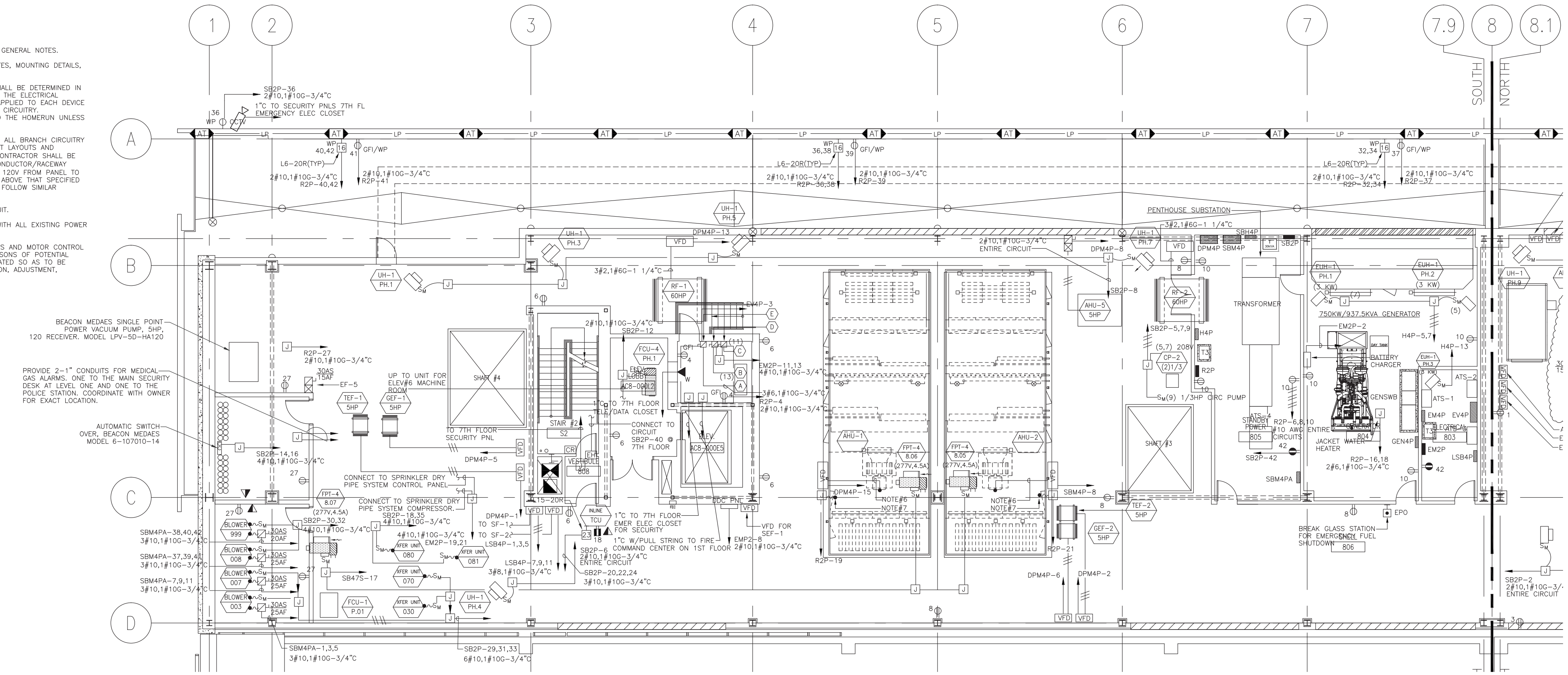
3. CIRCUIT NUMBERS ARE DIAGRAMMATIC. EXACT NUMBERS SHALL BE DETERMINED IN THE FIELD AND REFLECTED ON AS-BUILT DOCUMENTATION BY THE ELECTRICAL CONTRACTOR. THE ASSOCIATED CIRCUIT NUMBERS THAT ARE APPLIED TO EACH DEVICE AND PIECE OF EQUIPMENT INFERS INTERCONNECTING BRANCH CIRCUITRY. INTERCONNECTING BRANCH WIRING SHALL BE SIZED EQUAL TO THE HOMERUN UNLESS NOTED OTHERWISE.

4. VOLTAGE DROP HAS BEEN CONSIDERED IN THE DESIGN OF ALL BRANCH CIRCUITRY AND FEEDER SIZES BASED UPON THE ILLUSTRATED EQUIPMENT LAYOUTS AND SHORTEST CONDUCTOR/RACEWAY ROUTING. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR DEVIATIONS TAKEN THAT WILL INCREASE CONDUCTOR/RACEWAY ROUTING LENGTHS. BRANCH CIRCUITS LONGER THAN 75' FOR 120V FROM PANEL TO LAST OUTLET SHALL BE INCREASED A MINIMUM OF ONE SIZE ABOVE THAT SPECIFIED TO LIMIT VOLTAGE DROP TO LESS THAN 3%. FEEDERS SHALL FOLLOW SIMILAR GUIDELINES AND BE LIMITED TO 2% DROP.

5. POWER BRANCH CIRCUITRY SHALL BE INSTALLED IN CONDUIT.

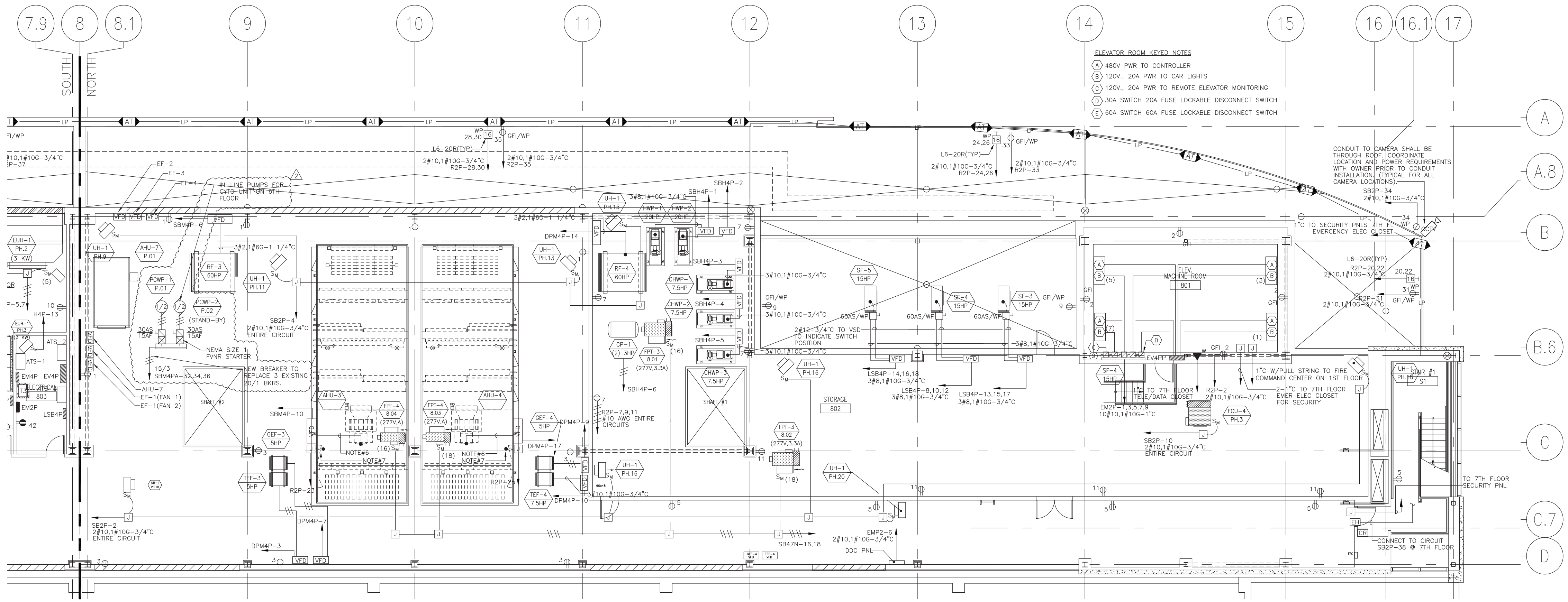
6. MAINTAIN CONTINUITY OF BRANCH CIRCUITRY ASSOCIATED WITH ALL EXISTING POWER DEVICES TO REMAIN.

7. SWITCHBOARDS, PANELBOARDS, METER SOCKET ENCLOSURES AND MOTOR CONTROL CENTERS SHALL BE FIELD MARKED TO WARN QUALIFIED PERSONS OF POTENTIAL ELECTRIC ARC FLASH HAZARDS. THE MARKING SHALL BE LOCATED SO AS TO BE CLEARLY VISIBLE TO QUALIFIED PERSONS BEFORE EXAMINATION, ADJUSTMENT, SERVICING, OR MAINTENANCE OF THE EQUIPMENT.



ELECTRICAL POWER PLAN PENTHOUSE LEVEL - SOUTH PART PLAN

SCALE: 1/8"=1'-0"



ELECTRICAL POWER PLAN PENTHOUSE LEVEL - NORTH PART PLAN

SCALE: 1/8"=1'-0"

PAYETTE

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Tel: 617-926-6100
Fax: 617-924-4431

MEP/FP Engineer

RDK Engineers
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Tel: 978-475-0298
Fax: 978-475-5768

CONSIGLI
Record Drawing
Feb 2013

Number	Date	Description
3	09/23/11	Issued As Record Drawing
2	10/07/10	Issued For ASI X-058
1	02/08/10	Issued For ASI X-048

N

RECORD DRAWING

UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL
Advanced Center for Clinical Education and Science
UNIVERSITY CAMPUS
PENTHOUSE

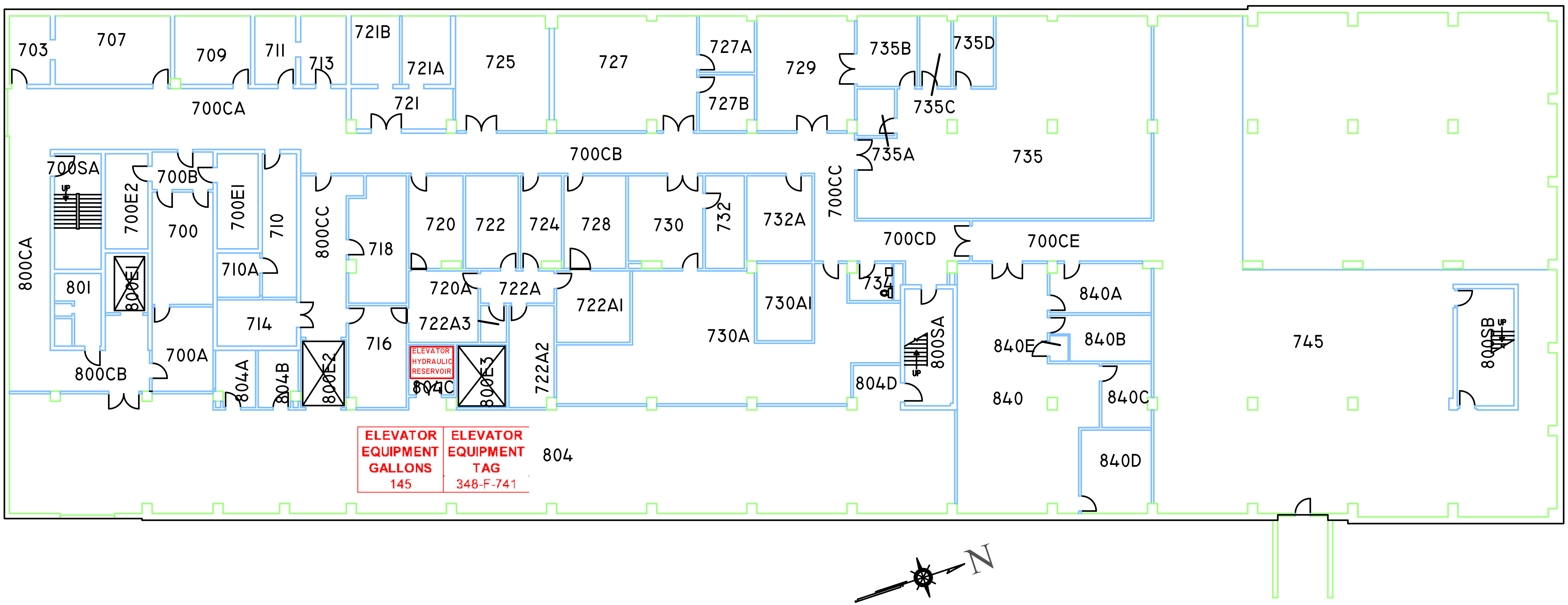
ELECTRICAL PENTHOUSE PLAN - POWER

Drawing Scale 1/8"=1'-0"

Project No. 42253.60

Date Issued 03/09/09

X-E2.81



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UMASS.

UNIV. OF MASS MEDICAL CENTER CAMPUS
SCHOOL-CLINICAL
LEVEL B

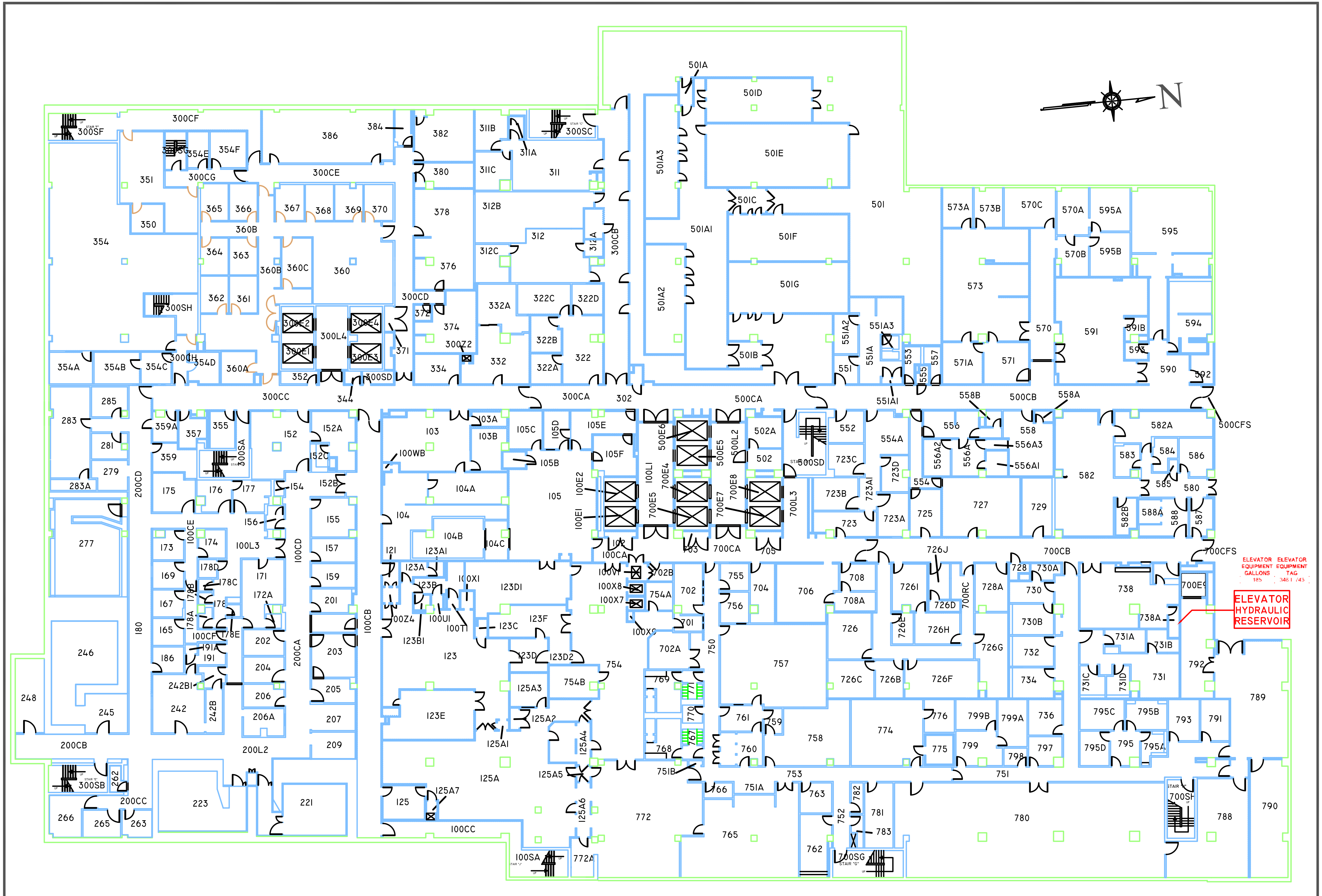
SPCCP

REVISIONS

MARK	DATE	ISSUE

DATE	1/1/07
DRAWN BY	AND
DESIGNED BY	AND
CHECKED BY	AND
APPROVED BY	PJH
SCALE	NA
PROJECT NO.	246-2006

S-1



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UMASS.

UNIV. OF MASS. MEDICAL CENTER CAMPUS
HOSPITAL

LEVEL B

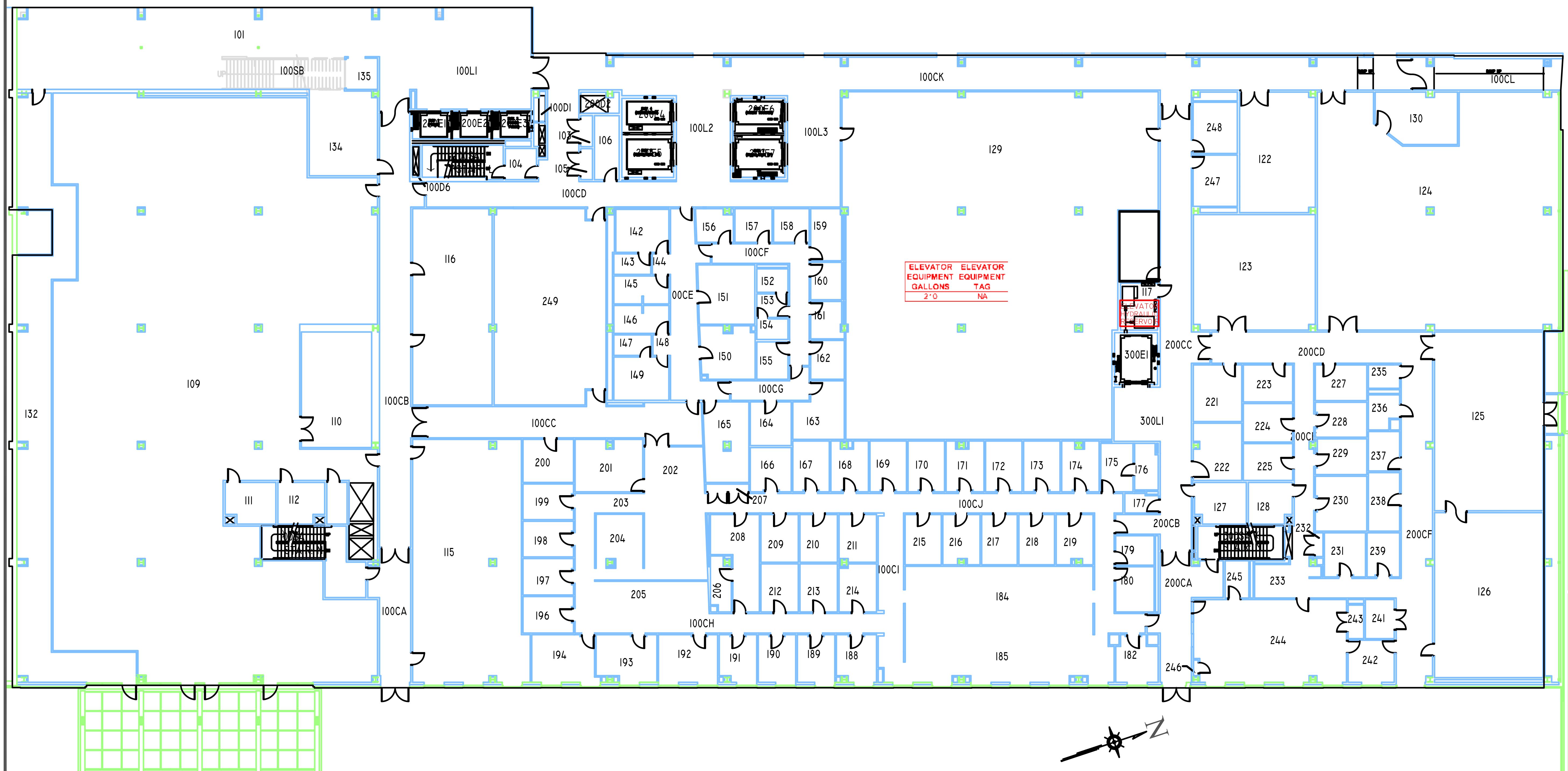
SPCCP

REVISIONS

MARK	DATE	ISSUE

DATE	1/1/07
DRAWN BY	AND
DESIGNED BY	AND
CHECKED BY	AND
APPROVED BY	PJH
SCALE	NA
PROJECT NO.	246-2006

H-1



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UMASS.

UNIV. OF MASS. MEDICAL CENTER CAMPUS
LAKESIDE ADDITION-HOSPITAL
LEVEL A

SPCCP

REVISIONS

MARK	DATE	ISSUE

DATE	8/1/07
DRAWN BY	AND
DESIGNED BY	AND
CHECKED BY	AND
APPROVED BY	PJH
SCALE	NA
PROJECT NO.	246-2006

L-1

ELEVATOR EQUIPMENT GALLONS	ELEVATOR EQUIPMENT TAG
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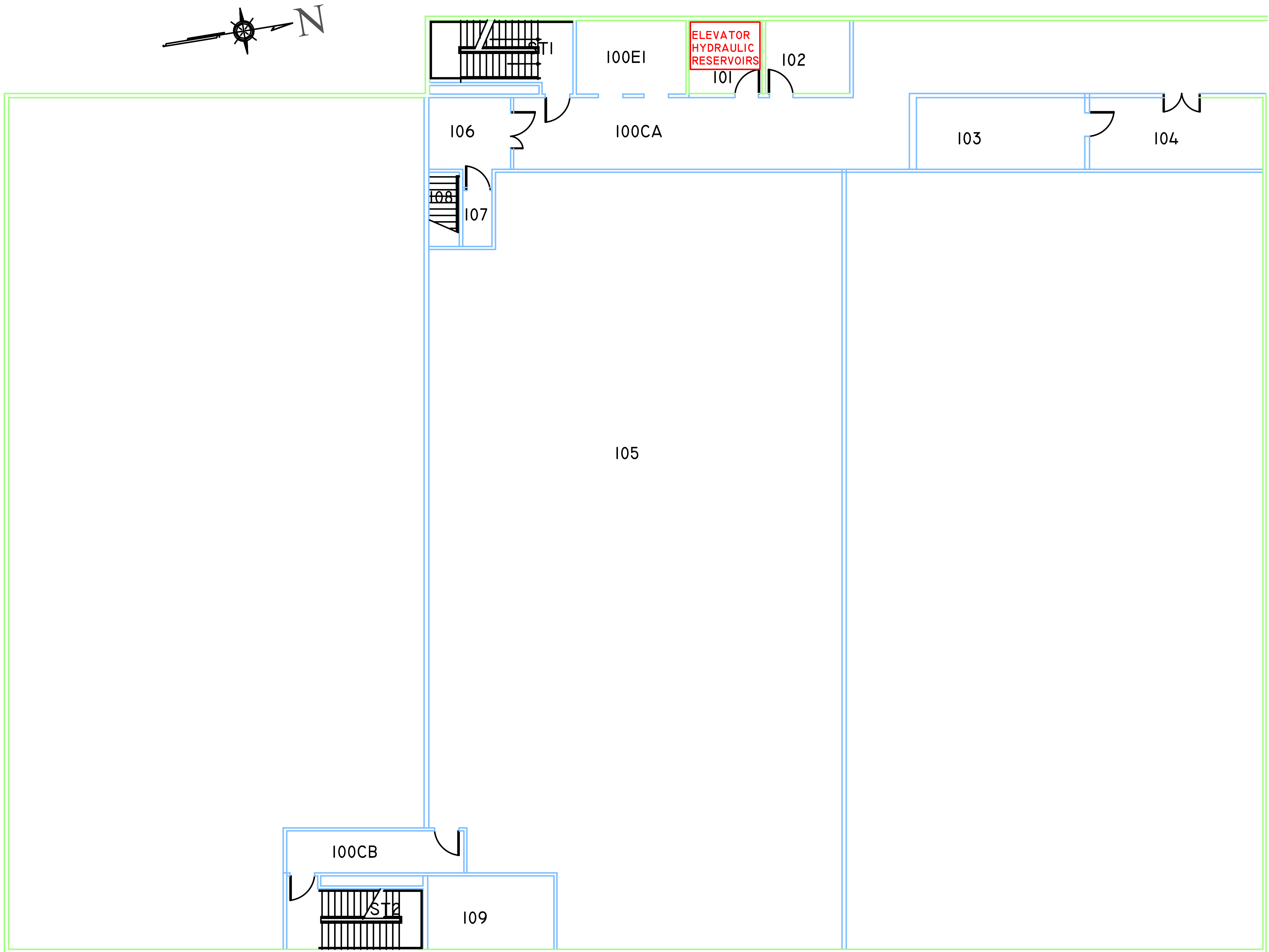

Facilities Planning, Engineering & Construction
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Worcester, MA 01655
(508) 856-2204 (office) (508) 856-5216 (fax)

UMASS.

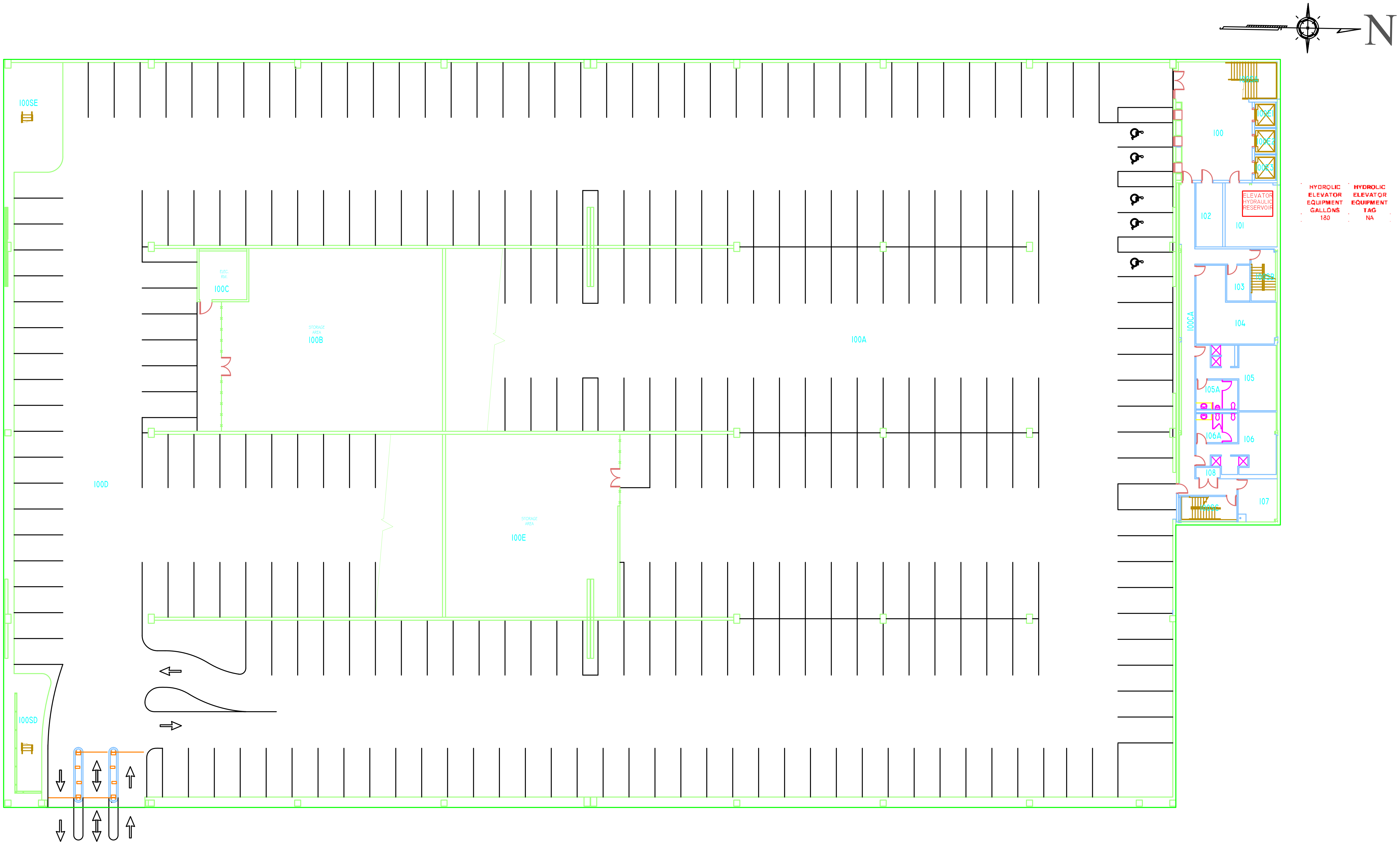
UNIV. OF MASS. MEDICAL CENTER CAMPUS
BENEDICT (ANNEX)
LEVEL A

SPCCP

REVISIONS		
MARK	DATE	ISSUE

DATE	1/1/07
DRAWN BY	AND
DESIGNED BY	AND
CHECKED BY	AND
APPROVED BY	PJH
SCALE	NA
PROJECT NO.	246-2006

B-1



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UMASS.

UNIV. OF MASS MEDICAL CENTER CAMPUS
SOUTH GARAGE
LEVEL 1

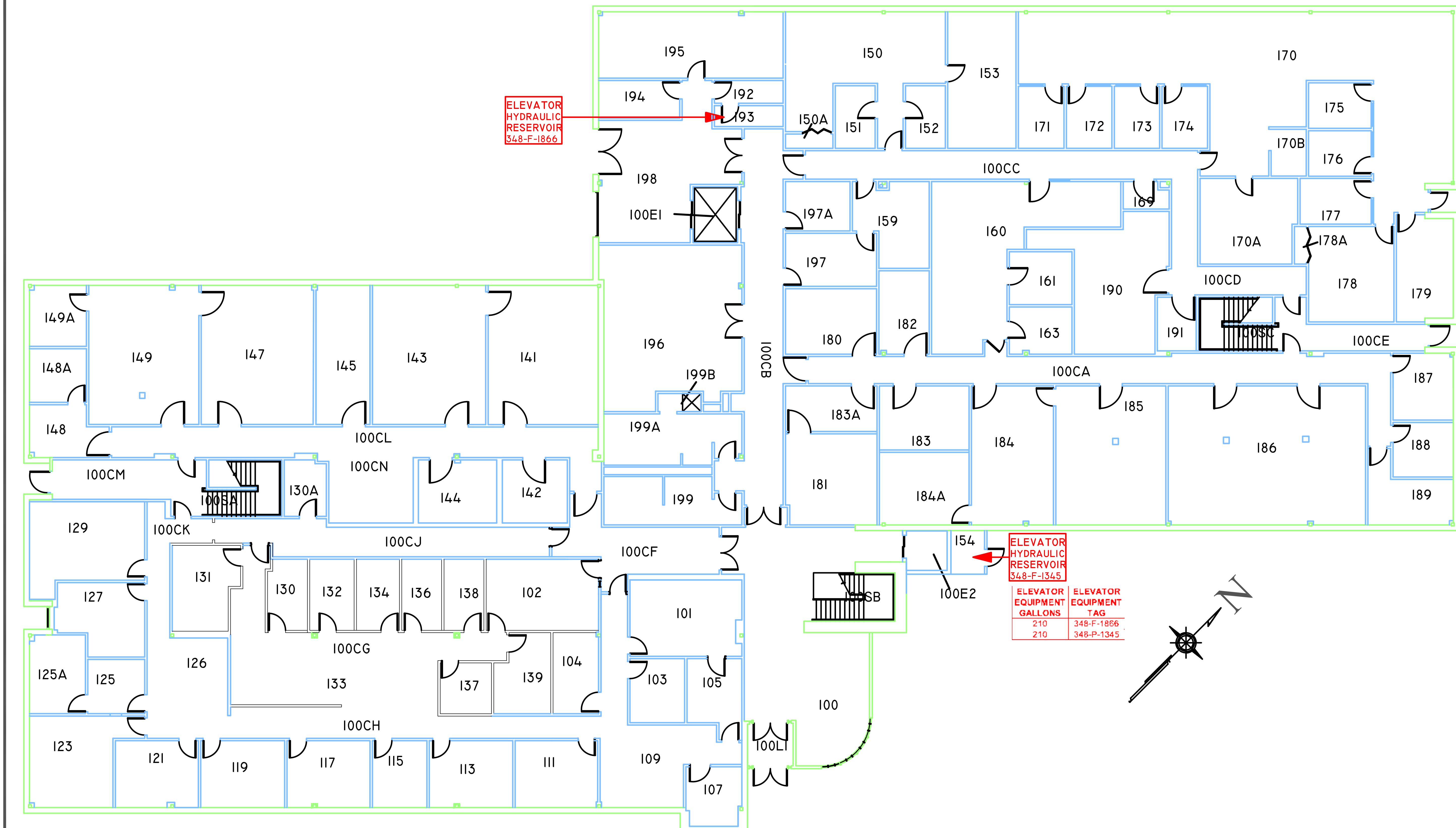
AS BUILT

REVISIONS

MARK	DATE	ISSUE

DATE	XX/XX/XX
DRAWN BY	XXXX
DESIGNED BY	XXXX
CHECKED BY	XXXX
APPROVED BY	XXXX
SCALE	XXXX
PROJECT NO.	XXXX

SG-1



Facilities Planning, Engineering & Construction
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Worcester, MA 01655
(508) 856-2204 (office) (508) 856-5216 (fax)

UMASS.

BIOTECH PARK FIRST FLOOR

ONE BIOTECH

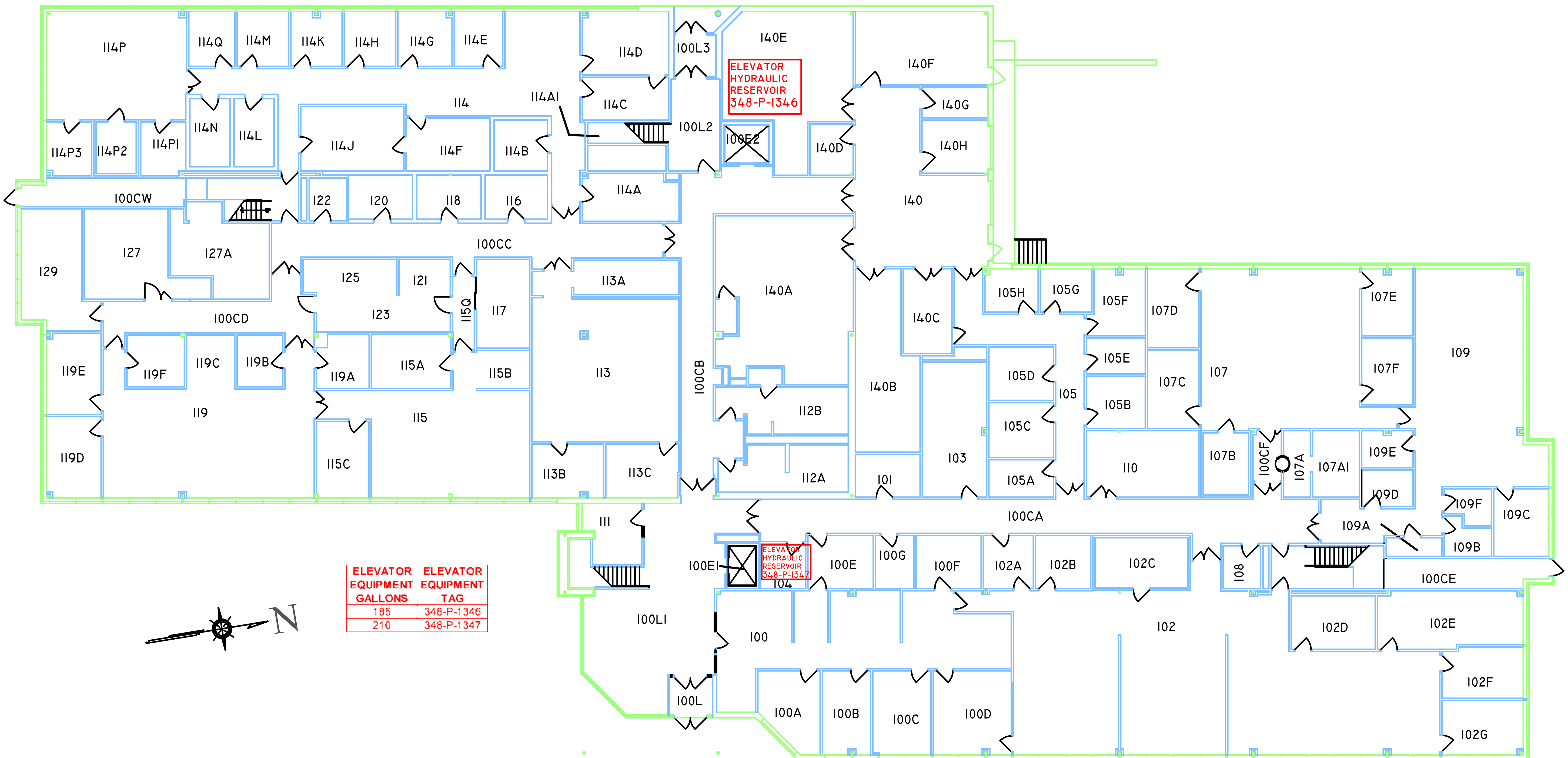
SPCCP

REVISIONS

MARK	DATE	ISSUE

DATE	1/1/07
DRAWN BY	AND
DESIGNED BY	AND
CHECKED BY	AND
APPROVED BY	PJH
SCALE	NA
PROJECT NO.	246-2006

B1-1



ELEVATOR EQUIPMENT GALLONS	ELEVATOR EQUIPMENT TAG
185	348-P-1346
210	348-P-1347

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UMASS.

BIOTECH PARK FIRST FLOOR

TWO BIOTECH

SPCCP

REVISIONS

MARK	DATE	ISSUE

DATE	1/1/07
DRAWN BY	AND
DESIGNED BY	AND
CHECKED BY	AND
APPROVED BY	PJH
SCALE	NA
PROJECT NO.	246-2006

B2-1

UMASS
University of Massachusetts
Medical School

Department of
Facilities Management
Power Plant : Level Two
55 Lake Avenue North
Worcester, Massachusetts 01655

PROJECT
UMASS MEDICAL SCHOOL

FLOOR LOCATION : WING LOCATION

DRAWING TITLE

Drain Sewer Site Plan

REVISIONS

NO.	DESCRIPTION	DATE

FILE: UMASS Master Site

DWN. BY:
CKD. BY:
JOB NO: n/a
SCALE: 1" = 70'
DATE: 4.Dec.2009

22

R:\FEC-As-Built\Site\Site\Master File\UMASS Master Site.dwg

APPENDIX A

SPCC REGULATIONS

Subpart A—Applicability, Definitions, and General Requirements for All Facilities and All Types of Oils

SOURCE: 67 FR 47140, July 17, 2002, unless otherwise noted.

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§112.1 General applicability.

(a)(1) This part establishes procedures, methods, equipment, and other requirements to prevent the discharge of oil from non-transportation-related onshore and offshore facilities into or upon the navigable waters of the United States or adjoining shorelines, or into or upon the waters of the contiguous zone, or in connection with activities under the Outer Continental Shelf Lands Act or the Deepwater Port Act of 1974, or that may affect natural resources belonging to, appertaining to, or under the exclusive management authority of the United States (including resources under the Magnuson Fishery Conservation and Management Act).

(2) As used in this part, words in the singular also include the plural and words in the masculine gender also include the feminine and vice versa, as the case may require.

(b) Except as provided in paragraph (d) of this section, this part applies to any owner or operator of a non-transportation-related onshore or offshore facility engaged in drilling, producing, gathering, storing, processing, refining, transferring, distributing, using, or consuming oil and oil products, which due to its location, could reasonably be expected to discharge oil in quantities that may be harmful, as described in part 110 of this chapter, into or upon the navigable waters of the United States or adjoining shorelines, or into or upon the waters of the contiguous zone, or in connection with activities under the Outer Continental Shelf Lands Act or the Deepwater Port Act of 1974, or that may affect natural resources belonging to, appertaining to, or under the exclusive management authority of the United States (including resources under the Magnuson Fishery Conservation and Management Act) that has oil in:

(1) Any aboveground container;

(2) Any completely buried tank as defined in §112.2;

(3) Any container that is used for standby storage, for seasonal storage, or for temporary storage, or not otherwise “permanently closed” as defined in §112.2;

(4) Any “bunkered tank” or “partially buried tank” as defined in §112.2, or any container in a vault, each of which is considered an aboveground storage container for purposes of this part.

(c) As provided in section 313 of the Clean Water Act (CWA), departments, agencies, and instrumentalities of the Federal government are subject to this part to the same extent as any person.

(d) Except as provided in paragraph (f) of this section, this part does not apply to:

(1) The owner or operator of any facility, equipment, or operation that is not subject to the jurisdiction of the Environmental Protection Agency (EPA) under section 311(j)(1)(C) of the CWA, as follows:

(i) Any onshore or offshore facility, that due to its location, could not reasonably be expected to have a discharge as described in paragraph (b) of this section. This determination must be based solely upon consideration of the geographical and location aspects of the facility (such as proximity to navigable waters or adjoining shorelines, land contour, drainage, etc.) and must exclude consideration of manmade features such as dikes, equipment or other structures, which may serve to restrain, hinder, contain, or otherwise prevent a discharge as described in paragraph (b) of this section.

(ii) Any equipment, or operation of a vessel or transportation-related onshore or offshore facility which is subject to the authority and control of the U.S. Department of Transportation, as defined in the Memorandum of Understanding between the Secretary of Transportation and the Administrator of EPA, dated November 24, 1971 (appendix A of this part).

(iii) Any equipment, or operation of a vessel or onshore or offshore facility which is subject to the authority and control of the U.S. Department of Transportation or the U.S. Department of the Interior, as defined in the

Memorandum of Understanding between the Secretary of Transportation, the Secretary of the Interior, and the Administrator of EPA, dated November 8, 1993 (appendix B of this part).

(2) Any facility which, although otherwise subject to the jurisdiction of EPA, meets both of the following requirements:

(i) The completely buried storage capacity of the facility is 42,000 U.S. gallons or less of oil. For purposes of this exemption, the completely buried storage capacity of a facility excludes the capacity of a completely buried tank, as defined in §112.2, and connected underground piping, underground ancillary equipment, and containment systems, that is currently subject to all of the technical requirements of part 280 of this chapter or all of the technical requirements of a State program approved under part 281 of this chapter, or the capacity of any underground oil storage tanks deferred under 40 CFR part 280 that supply emergency diesel generators at a nuclear power generation facility licensed by the Nuclear Regulatory Commission and subject to any Nuclear Regulatory Commission provision regarding design and quality criteria, including, but not limited to, 10 CFR part 50. The completely buried storage capacity of a facility also excludes the capacity of a container that is “permanently closed,” as defined in §112.2 and the capacity of intra-facility gathering lines subject to the regulatory requirements of 49 CFR part 192 or 195.

(ii) The aggregate aboveground storage capacity of the facility is 1,320 U.S. gallons or less of oil. For the purposes of this exemption, only containers with a capacity of 55 U.S. gallons or greater are counted. The aggregate aboveground storage capacity of a facility excludes:

(A) The capacity of a container that is “permanently closed” as defined in §112.2;

(B) The capacity of a “motive power container” as defined in §112.2;

(C) The capacity of hot-mix asphalt or any hot-mix asphalt container;

(D) The capacity of a container for heating oil used solely at a single-family residence;

(E) The capacity of pesticide application equipment and related mix containers.

(F) The capacity of any milk and milk product container and associated piping and appurtenances.

(3) Any offshore oil drilling, production, or workover facility that is subject to the notices and regulations of the Minerals Management Service, as specified in the Memorandum of Understanding between the Secretary of Transportation, the Secretary of the Interior, and the Administrator of EPA, dated November 8, 1993 (appendix B of this part).

(4) Any completely buried storage tank, as defined in §112.2, and connected underground piping, underground ancillary equipment, and containment systems, at any facility, that is subject to all of the technical requirements of part 280 of this chapter or a State program approved under part 281 of this chapter, or any underground oil storage tanks including below-grade vaulted tanks, deferred under 40 CFR part 280, as originally promulgated, that supply emergency diesel generators at a nuclear power generation facility licensed by the Nuclear Regulatory Commission, provided that such a tank is subject to any Nuclear Regulatory Commission provision regarding design and quality criteria, including, but not limited to, 10 CFR part 50. Such emergency generator tanks must be marked on the facility diagram as provided in §112.7(a)(3), if the facility is otherwise subject to this part.

(5) Any container with a storage capacity of less than 55 gallons of oil.

(6) Any facility or part thereof used exclusively for wastewater treatment and not used to satisfy any requirement of this part. The production, recovery, or recycling of oil is not wastewater treatment for purposes of this paragraph.

(7) Any “motive power container,” as defined in §112.2. The transfer of fuel or other oil into a motive power container at an otherwise regulated facility is not eligible for this exemption.

(8) Hot-mix asphalt, or any hot-mix asphalt container.

(9) Any container for heating oil used solely at a single-family residence.

(10) Any pesticide application equipment or related mix containers.

(11) Intra-facility gathering lines subject to the regulatory requirements of 49 CFR part 192 or 195, except that

such a line's location must be identified and marked as “exempt” on the facility diagram as provided in §112.7(a)(3), if the facility is otherwise subject to this part.

(12) Any milk and milk product container and associated piping and appurtenances.

(e) This part establishes requirements for the preparation and implementation of Spill Prevention, Control, and Countermeasure (SPCC) Plans. SPCC Plans are designed to complement existing laws, regulations, rules, standards, policies, and procedures pertaining to safety standards, fire prevention, and pollution prevention rules. The purpose of an SPCC Plan is to form a comprehensive Federal/State spill prevention program that minimizes the potential for discharges. The SPCC Plan must address all relevant spill prevention, control, and countermeasures necessary at the specific facility. Compliance with this part does not in any way relieve the owner or operator of an onshore or an offshore facility from compliance with other Federal, State, or local laws.

(f) Notwithstanding paragraph (d) of this section, the Regional Administrator may require that the owner or operator of any facility subject to the jurisdiction of EPA under section 311(j) of the CWA prepare and implement an SPCC Plan, or any applicable part, to carry out the purposes of the CWA.

(1) Following a preliminary determination, the Regional Administrator must provide a written notice to the owner or operator stating the reasons why he must prepare an SPCC Plan, or applicable part. The Regional Administrator must send such notice to the owner or operator by certified mail or by personal delivery. If the owner or operator is a corporation, the Regional Administrator must also mail a copy of such notice to the registered agent, if any and if known, of the corporation in the State where the facility is located.

(2) Within 30 days of receipt of such written notice, the owner or operator may provide information and data and may consult with the Agency about the need to prepare an SPCC Plan, or applicable part.

(3) Within 30 days following the time under paragraph (b)(2) of this section within which the owner or operator may provide information and data and consult with the Agency about the need to prepare an SPCC Plan, or applicable part, the Regional Administrator must make a final determination regarding whether the owner or operator is required to prepare and implement an SPCC Plan, or applicable part. The Regional Administrator must send the final determination to the owner or operator by certified mail or by personal delivery. If the owner or operator is a corporation, the Regional Administrator must also mail a copy of the final determination to the registered agent, if any and if known, of the corporation in the State where the facility is located.

(4) If the Regional Administrator makes a final determination that an SPCC Plan, or applicable part, is necessary, the owner or operator must prepare the Plan, or applicable part, within six months of that final determination and implement the Plan, or applicable part, as soon as possible, but not later than one year after the Regional Administrator has made a final determination.

(5) The owner or operator may appeal a final determination made by the Regional Administrator requiring preparation and implementation of an SPCC Plan, or applicable part, under this paragraph. The owner or operator must make the appeal to the Administrator of EPA within 30 days of receipt of the final determination under paragraph (b)(3) of this section from the Regional Administrator requiring preparation and/or implementation of an SPCC Plan, or applicable part. The owner or operator must send a complete copy of the appeal to the Regional Administrator at the time he makes the appeal to the Administrator. The appeal must contain a clear and concise statement of the issues and points of fact in the case. In the appeal, the owner or operator may also provide additional information. The additional information may be from any person. The Administrator may request additional information from the owner or operator. The Administrator must render a decision within 60 days of receiving the appeal or additional information submitted by the owner or operator and must serve the owner or operator with the decision made in the appeal in the manner described in paragraph (f)(1) of this section.

[67 FR 47140, July 17, 2002, as amended at 71 FR 77290, Dec. 26, 2006; 73 FR 74300, Dec. 5, 2008; 74 FR 58809, Nov. 13, 2009; 76 FR 21660, Apr. 18, 2011]

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§112.2 Definitions.

For the purposes of this part:

Adverse weather means weather conditions that make it difficult for response equipment and personnel to clean up or remove spilled oil, and that must be considered when identifying response systems and equipment in a response plan for the applicable operating environment. Factors to consider include significant wave height as specified in appendix E to this part (as appropriate), ice conditions, temperatures, weather-related visibility, and currents within the area in which the systems or equipment is intended to function.

Alteration means any work on a container involving cutting, burning, welding, or heating operations that changes the physical dimensions or configuration of the container.

Animal fat means a non-petroleum oil, fat, or grease of animal, fish, or marine mammal origin.

Breakout tank means a container used to relieve surges in an oil pipeline system or to receive and store oil transported by a pipeline for reinjection and continued transportation by pipeline.

Bulk storage container means any container used to store oil. These containers are used for purposes including, but not limited to, the storage of oil prior to use, while being used, or prior to further distribution in commerce. Oil-filled electrical, operating, or manufacturing equipment is not a bulk storage container.

Bunkered tank means a container constructed or placed in the ground by cutting the earth and re-covering the container in a manner that breaks the surrounding natural grade, or that lies above grade, and is covered with earth, sand, gravel, asphalt, or other material. A bunkered tank is considered an aboveground storage container for purposes of this part.

Completely buried tank means any container completely below grade and covered with earth, sand, gravel, asphalt, or other material. Containers in vaults, bunkered tanks, or partially buried tanks are considered aboveground storage containers for purposes of this part.

Complex means a facility possessing a combination of transportation-related and non-transportation-related components that is subject to the jurisdiction of more than one Federal agency under section 311(j) of the CWA.

Contiguous zone means the zone established by the United States under Article 24 of the Convention of the Territorial Sea and Contiguous Zone, that is contiguous to the territorial sea and that extends nine miles seaward from the outer limit of the territorial area.

Contract or other approved means means:

(1) A written contractual agreement with an oil spill removal organization that identifies and ensures the availability of the necessary personnel and equipment within appropriate response times; and/or

(2) A written certification by the owner or operator that the necessary personnel and equipment resources, owned or operated by the facility owner or operator, are available to respond to a discharge within appropriate response times; and/or

(3) Active membership in a local or regional oil spill removal organization that has identified and ensures adequate access through such membership to necessary personnel and equipment to respond to a discharge within appropriate response times in the specified geographic area; and/or

(4) Any other specific arrangement approved by the Regional Administrator upon request of the owner or operator.

Discharge includes, but is not limited to, any spilling, leaking, pumping, pouring, emitting, emptying, or dumping of oil, but excludes discharges in compliance with a permit under section 402 of the CWA; discharges resulting from circumstances identified, reviewed, and made a part of the public record with respect to a permit issued or modified under section 402 of the CWA, and subject to a condition in such permit; or continuous or anticipated intermittent discharges from a point source, identified in a permit or permit application under section 402 of the CWA, that are caused by events occurring within the scope of relevant operating or treatment systems. For purposes of this part, the term discharge shall not include any discharge of oil that is authorized by a permit issued under section 13 of the River and Harbor Act of 1899 (33 U.S.C. 407).

Facility means any mobile or fixed, onshore or offshore building, property, parcel, lease, structure, installation, equipment, pipe, or pipeline (other than a vessel or a public vessel) used in oil well drilling operations, oil production, oil refining, oil storage, oil gathering, oil processing, oil transfer, oil distribution, and oil waste treatment, or in which oil is used, as described in appendix A to this part. The boundaries of a facility depend on several site-specific factors, including but not limited to, the ownership or operation of buildings, structures, and equipment on the same site and types of activity at the site. Contiguous or non-contiguous buildings, properties, parcels, leases, structures, installations, pipes, or pipelines under the ownership or operation of the same person may be considered separate facilities. Only this definition governs whether a facility is subject to this part.

Farm means a facility on a tract of land devoted to the production of crops or raising of animals, including fish, which produced and sold, or normally would have produced and sold, $1,000 or more of agricultural products during a year.

Fish and wildlife and sensitive environments means areas that may be identified by their legal designation or by evaluations of Area Committees (for planning) or members of the Federal On-Scene Coordinator's spill response structure (during responses). These areas may include wetlands, National and State parks, critical habitats for endangered or threatened species, wilderness and natural resource areas, marine sanctuaries and estuarine reserves, conservation areas, preserves, wildlife areas, wildlife refuges, wild and scenic rivers, recreational areas, national forests, Federal and State lands that are research national areas, heritage program areas, land trust areas, and historical and archaeological sites and parks. These areas may also include unique habitats such as aquaculture sites and agricultural surface water intakes, bird nesting areas, critical biological resource areas, designated migratory routes, and designated seasonal habitats.

Injury means a measurable adverse change, either long- or short-term, in the chemical or physical quality or the viability of a natural resource resulting either directly or indirectly from exposure to a discharge, or exposure to a product of reactions resulting from a discharge.

Loading/unloading rack means a fixed structure (such as a platform, gangway) necessary for loading or unloading a tank truck or tank car, which is located at a facility subject to the requirements of this part. A loading/unloading rack includes a loading or unloading arm, and may include any combination of the following: piping assemblages, valves, pumps, shut-off devices, overfill sensors, or personnel safety devices.

Maximum extent practicable means within the limitations used to determine oil spill planning resources and response times for on-water recovery, shoreline protection, and cleanup for worst case discharges from onshore non-transportation-related facilities in adverse weather. It includes the planned capability to respond to a worst case discharge in adverse weather, as contained in a response plan that meets the requirements in §112.20 or in a specific plan approved by the Regional Administrator.

Mobile refueler means a bulk storage container onboard a vehicle or towed, that is designed or used solely to store and transport fuel for transfer into or from an aircraft, motor vehicle, locomotive, vessel, ground service equipment, or other oil storage container.

Motive power container means any onboard bulk storage container used primarily to power the movement of a motor vehicle, or ancillary onboard oil-filled operational equipment. An onboard bulk storage container which is used to store or transfer oil for further distribution is not a motive power container. The definition of motive power container does not include oil drilling or workover equipment, including rigs.

Navigable waters of the United States means “navigable waters” as defined in section 502(7) of the FWPCA, and includes:

(1) All navigable waters of the United States, as defined in judicial decisions prior to passage of the 1972 Amendments to the FWPCA (Pub. L. 92-500), and tributaries of such waters;

(2) Interstate waters;

(3) Intrastate lakes, rivers, and streams which are utilized by interstate travelers for recreational or other purposes; and

(4) Intrastate lakes, rivers, and streams from which fish or shellfish are taken and sold in interstate commerce.

Non-petroleum oil means oil of any kind that is not petroleum-based, including but not limited to: Fats, oils, and greases of animal, fish, or marine mammal origin; and vegetable oils, including oils from seeds, nuts, fruits, and kernels.

Offshore facility means any facility of any kind (other than a vessel or public vessel) located in, on, or under any of the navigable waters of the United States, and any facility of any kind that is subject to the jurisdiction of the United States and is located in, on, or under any other waters.

Oil means oil of any kind or in any form, including, but not limited to: fats, oils, or greases of animal, fish, or marine mammal origin; vegetable oils, including oils from seeds, nuts, fruits, or kernels; and, other oils and greases, including petroleum, fuel oil, sludge, synthetic oils, mineral oils, oil refuse, or oil mixed with wastes other than dredged spoil.

Oil-filled operational equipment means equipment that includes an oil storage container (or multiple containers) in which the oil is present solely to support the function of the apparatus or the device. Oil-filled operational equipment is not considered a bulk storage container, and does not include oil-filled manufacturing equipment (flow-through process). Examples of oil-filled operational equipment include, but are not limited to, hydraulic systems, lubricating systems (e.g., those for pumps, compressors and other rotating equipment, including pumpjack lubrication systems), gear boxes, machining coolant systems, heat transfer systems, transformers, circuit breakers, electrical switches, and other systems containing oil solely to enable the operation of the device.

Oil Spill Removal Organization means an entity that provides oil spill response resources, and includes any for-profit or not-for-profit contractor, cooperative, or in-house response resources that have been established in a geographic area to provide required response resources.

Onshore facility means any facility of any kind located in, on, or under any land within the United States, other than submerged lands.

Owner or operator means any person owning or operating an onshore facility or an offshore facility, and in the case of any abandoned offshore facility, the person who owned or operated or maintained the facility immediately prior to such abandonment.

Partially buried tank means a storage container that is partially inserted or constructed in the ground, but not entirely below grade, and not completely covered with earth, sand, gravel, asphalt, or other material. A partially buried tank is considered an aboveground storage container for purposes of this part.

Permanently closed means any container or facility for which:

(1) All liquid and sludge has been removed from each container and connecting line; and

(2) All connecting lines and piping have been disconnected from the container and blanked off, all valves (except for ventilation valves) have been closed and locked, and conspicuous signs have been posted on each container stating that it is a permanently closed container and noting the date of closure.

Person includes an individual, firm, corporation, association, or partnership.

Petroleum oil means petroleum in any form, including but not limited to crude oil, fuel oil, mineral oil, sludge, oil refuse, and refined products.

Produced water container means a storage container at an oil production facility used to store the produced water after initial oil/water separation, and prior to reinjection, beneficial reuse, discharge, or transfer for disposal.

Production facility means all structures (including but not limited to wells, platforms, or storage facilities), piping (including but not limited to flowlines or intra-facility gathering lines), or equipment (including but not limited to workover equipment, separation equipment, or auxiliary non-transportation-related equipment) used in the production, extraction, recovery, lifting, stabilization, separation or treating of oil (including condensate), or associated storage or measurement, and is located in an oil or gas field, at a facility. This definition governs whether such structures, piping, or equipment are subject to a specific section of this part.

Regional Administrator means the Regional Administrator of the Environmental Protection Agency, in and for the Region in which the facility is located.

Repair means any work necessary to maintain or restore a container to a condition suitable for safe operation, other than that necessary for ordinary, day-to-day maintenance to maintain the functional integrity of the container and that does not weaken the container.

Spill Prevention, Control, and Countermeasure Plan*;* SPCC Plan, or Plan means the document required by §112.3 that details the equipment, workforce, procedures, and steps to prevent, control, and provide adequate countermeasures to a discharge.

Storage capacity of a container means the shell capacity of the container.

Transportation-related and non-transportation-related, as applied to an onshore or offshore facility, are defined in the Memorandum of Understanding between the Secretary of Transportation and the Administrator of the Environmental Protection Agency, dated November 24, 1971, (appendix A of this part).

United States means the States, the District of Columbia, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, Guam, American Samoa, the U.S. Virgin Islands, and the Pacific Island Governments.

Vegetable oil means a non-petroleum oil or fat of vegetable origin, including but not limited to oils and fats derived from plant seeds, nuts, fruits, and kernels.

Vessel means every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water, other than a public vessel.

Wetlands means those areas that are inundated or saturated by surface or groundwater at a frequency or duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include playa lakes, swamps, marshes, bogs, and similar areas such as sloughs, prairie potholes, wet meadows, prairie river overflows, mudflats, and natural ponds.

Worst case discharge for an onshore non-transportation-related facility means the largest foreseeable discharge in adverse weather conditions as determined using the worksheets in appendix D to this part.

[67 FR 47140, July 17, 2002, as amended at 71 FR 77290, Dec. 26, 2006; 73 FR 71943, Nov. 26, 2008; 73 FR 74300, Dec. 5, 2008]

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§112.3 Requirement to prepare and implement a Spill Prevention, Control, and Countermeasure Plan.

The owner or operator or an onshore or offshore facility subject to this section must prepare in writing and implement a Spill Prevention Control and Countermeasure Plan (hereafter “SPCC Plan” or “Plan”),” in accordance with §112.7 and any other applicable section of this part.

(a)(1) Except as otherwise provided in this section, if your facility, or mobile or portable facility, was in operation on or before August 16, 2002, you must maintain your Plan, but must amend it, if necessary to ensure compliance with this part, and implement the amended Plan no later than November 10, 2011. If such a facility becomes operational after August 16, 2002, through November 10, 2011, and could reasonably be expected to have a discharge as described in §112.1(b), you must prepare and implement a Plan on or before November 10, 2011. If such a facility (excluding oil production facilities) becomes operational after November 10, 2011, and could reasonably be expected to have a discharge as described in §112.1(b), you must prepare and implement a Plan before you begin operations. You are not required to prepare a new Plan each time you move a mobile or portable facility to a new site; the Plan may be general. When you move the mobile or portable facility, you must locate and install it using the discharge prevention practices outlined in the Plan for the facility. The Plan is applicable only while the mobile or portable facility is in a fixed (non-transportation) operating mode.

(2) If your drilling, production or workover facility, including a mobile or portable facility, is offshore or has an offshore component; or your onshore facility is required to have and submit a Facility Response Plan pursuant to 40 CFR 112.20(a), and was in operation on or before August 16, 2002, you must maintain your Plan, but must amend it, if necessary to ensure compliance with this part, and implement the amended Plan no later than November 10, 2010. If such a facility becomes operational after August 16, 2002, through November 10, 2010, and could reasonably be expected to have a discharge as described in §112.1(b), you must prepare and implement a Plan on or before November 10, 2010. If such a facility (excluding oil production facilities) becomes operational after November 10, 2010, and could reasonably be expected to have a discharge as described in §112.1(b), you must prepare and implement a Plan before you begin operations. You are not required to prepare a new Plan each time you move a mobile or portable facility to a new site; the Plan may be general. When you move the mobile or portable facility, you must locate and install it using the discharge prevention practices outlined in the Plan for the facility. The Plan is applicable only while the mobile or portable facility is in a fixed (non-transportation) operating mode.

(3) If your farm, as defined in §112.2, was in operation on or before August 16, 2002, you must maintain your Plan, but must amend it, if necessary to ensure compliance with this part, and implement the amended Plan on or before May 10, 2013. If your farm becomes operational after August 16, 2002, through May 10, 2013, and could reasonably be expected to have a discharge as described in §112.1(b), you must prepare and implement a Plan on

or before May 10, 2013. If your farm becomes operational after May 10, 2013, and could reasonably be expected to have a discharge as described in §112.1(b), you must prepare and implement a Plan before you begin operations.

(b) If your oil production facility as described in paragraph (a)(1) of this section becomes operational after November 10, 2011, or as described in paragraph (a)(2) of this section becomes operational after November 10, 2010, and could reasonably be expected to have a discharge as described in §112.1(b), you must prepare and implement a Plan within six months after you begin operations.

(c) [Reserved]

(d) Except as provided in §112.6, a licensed Professional Engineer must review and certify a Plan for it to be effective to satisfy the requirements of this part.

(1) By means of this certification the Professional Engineer attests:

(i) That he is familiar with the requirements of this part ;

(ii) That he or his agent has visited and examined the facility;

(iii) That the Plan has been prepared in accordance with good engineering practice, including consideration of applicable industry standards, and with the requirements of this part;

(iv) That procedures for required inspections and testing have been established; and

(v) That the Plan is adequate for the facility.

(vi) That, if applicable, for a produced water container subject to §112.9(c)(6), any procedure to minimize the amount of free-phase oil is designed to reduce the accumulation of free-phase oil and the procedures and frequency for required inspections, maintenance and testing have been established and are described in the Plan.

(2) Such certification shall in no way relieve the owner or operator of a facility of his duty to prepare and fully implement such Plan in accordance with the requirements of this part.

(e) If you are the owner or operator of a facility for which a Plan is required under this section, you must:

(1) Maintain a complete copy of the Plan at the facility if the facility is normally attended at least four hours per day, or at the nearest field office if the facility is not so attended, and

(2) Have the Plan available to the Regional Administrator for on-site review during normal working hours.

(f) Extension of time. (1) The Regional Administrator may authorize an extension of time for the preparation and full implementation of a Plan, or any amendment thereto, beyond the time permitted for the preparation, implementation, or amendment of a Plan under this part, when he finds that the owner or operator of a facility subject to this section, cannot fully comply with the requirements as a result of either nonavailability of qualified personnel, or delays in construction or equipment delivery beyond the control and without the fault of such owner or operator or his agents or employees.

(2) If you are an owner or operator seeking an extension of time under paragraph (f)(1) of this section, you may submit a written extension request to the Regional Administrator. Your request must include:

(i) A full explanation of the cause for any such delay and the specific aspects of the Plan affected by the delay;

(ii) A full discussion of actions being taken or contemplated to minimize or mitigate such delay; and

(iii) A proposed time schedule for the implementation of any corrective actions being taken or contemplated, including interim dates for completion of tests or studies, installation and operation of any necessary equipment, or other preventive measures. In addition you may present additional oral or written statements in support of your extension request.

(3) The submission of a written extension request under paragraph (f)(2) of this section does not relieve you of your obligation to comply with the requirements of this part. The Regional Administrator may request a copy of your Plan to evaluate the extension request. When the Regional Administrator authorizes an extension of time for particular equipment or other specific aspects of the Plan, such extension does not affect your obligation to comply

with the requirements related to other equipment or other specific aspects of the Plan for which the Regional Administrator has not expressly authorized an extension.

(g) Qualified Facilities. The owner or operator of a qualified facility as defined in this subparagraph may self-certify his facility's Plan, as provided in §112.6. A qualified facility is one that meets the following Tier I or Tier II qualified facility criteria:

(1) A Tier I qualified facility meets the qualification criteria in paragraph (g)(2) of this section and has no individual aboveground oil storage container with a capacity greater than 5,000 U.S. gallons.

(2) A Tier II qualified facility is one that has had no single discharge as described in §112.1(b) exceeding 1,000 U.S. gallons or no two discharges as described in §112.1(b) each exceeding 42 U.S. gallons within any twelve month period in the three years prior to the SPCC Plan self-certification date, or since becoming subject to this part if the facility has been in operation for less than three years (other than discharges as described in §112.1(b) that are the result of natural disasters, acts of war, or terrorism), and has an aggregate aboveground oil storage capacity of 10,000 U.S. gallons or less.

[67 FR 47140, July 17, 2002, as amended at 68 FR 1351, Jan. 9, 2003; 68 FR 18894, Apr. 17, 2003; 69 FR 48798, Aug. 11, 2004; 71 FR 8466, Feb. 17, 2006; 71 FR 77290, Dec. 26, 2006; 72 FR 27447, May 16, 2007; 73 FR 74301, Dec. 5, 2008, 74 FR 29141, June 19, 2009; 74 FR 58809, Nov. 13, 2009; 75 FR 63102, Oct. 14, 2010; 76 FR 21660, Apr. 18, 2011; 76 FR 64248, Oct. 18, 2011; 76 FR 72124, Nov. 22, 2011]

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§112.4 Amendment of Spill Prevention, Control, and Countermeasure Plan by Regional Administrator.

If you are the owner or operator of a facility subject to this part, you must:

(a) Notwithstanding compliance with §112.3, whenever your facility has discharged more than 1,000 U.S. gallons of oil in a single discharge as described in §112.1(b), or discharged more than 42 U.S. gallons of oil in each of two discharges as described in §112.1(b), occurring within any twelve month period, submit the following information to the Regional Administrator within 60 days from the time the facility becomes subject to this section:

(1) Name of the facility;

(2) Your name;

(3) Location of the facility;

(4) Maximum storage or handling capacity of the facility and normal daily throughput;

(5) Corrective action and countermeasures you have taken, including a description of equipment repairs and replacements;

(6) An adequate description of the facility, including maps, flow diagrams, and topographical maps, as necessary;

(7) The cause of such discharge as described in §112.1(b), including a failure analysis of the system or subsystem in which the failure occurred;

(8) Additional preventive measures you have taken or contemplated to minimize the possibility of recurrence; and

(9) Such other information as the Regional Administrator may reasonably require pertinent to the Plan or discharge.

(b) Take no action under this section until it applies to your facility. This section does not apply until the expiration of the time permitted for the initial preparation and implementation of the Plan under §112.3, but not including any amendments to the Plan.

(c) Send to the appropriate agency or agencies in charge of oil pollution control activities in the State in which the facility is located a complete copy of all information you provided to the Regional Administrator under paragraph (a) of this section. Upon receipt of the information such State agency or agencies may conduct a review and make recommendations to the Regional Administrator as to further procedures, methods, equipment, and other requirements necessary to prevent and to contain discharges from your facility.

(d) Amend your Plan, if after review by the Regional Administrator of the information you submit under paragraph (a) of this section, or submission of information to EPA by the State agency under paragraph (c) of this section, or after on-site review of your Plan, the Regional Administrator requires that you do so. The Regional Administrator may require you to amend your Plan if he finds that it does not meet the requirements of this part or that amendment is necessary to prevent and contain discharges from your facility.

(e) Act in accordance with this paragraph when the Regional Administrator proposes by certified mail or by personal delivery that you amend your SPCC Plan. If the owner or operator is a corporation, he must also notify by mail the registered agent of such corporation, if any and if known, in the State in which the facility is located. The Regional Administrator must specify the terms of such proposed amendment. Within 30 days from receipt of such notice, you may submit written information, views, and arguments on the proposed amendment. After considering all relevant material presented, the Regional Administrator must either notify you of any amendment required or rescind the notice. You must amend your Plan as required within 30 days after such notice, unless the Regional Administrator, for good cause, specifies another effective date. You must implement the amended Plan as soon as possible, but not later than six months after you amend your Plan, unless the Regional Administrator specifies another date.

(f) If you appeal a decision made by the Regional Administrator requiring an amendment to an SPCC Plan, send the appeal to the EPA Administrator in writing within 30 days of receipt of the notice from the Regional Administrator requiring the amendment under paragraph (e) of this section. You must send a complete copy of the appeal to the Regional Administrator at the time you make the appeal. The appeal must contain a clear and concise statement of the issues and points of fact in the case. It may also contain additional information from you, or from any other person. The EPA Administrator may request additional information from you, or from any other person. The EPA Administrator must render a decision within 60 days of receiving the appeal and must notify you of his decision.

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§112.5 Amendment of Spill Prevention, Control, and Countermeasure Plan by owners or operators.

If you are the owner or operator of a facility subject to this part, you must:

(a) Amend the SPCC Plan for your facility in accordance with the general requirements in §112.7, and with any specific section of this part applicable to your facility, when there is a change in the facility design, construction, operation, or maintenance that materially affects its potential for a discharge as described in §112.1(b). Examples of changes that may require amendment of the Plan include, but are not limited to: commissioning or decommissioning containers; replacement, reconstruction, or movement of containers; reconstruction, replacement, or installation of piping systems; construction or demolition that might alter secondary containment structures; changes of product or service; or revision of standard operation or maintenance procedures at a facility. An amendment made under this section must be prepared within six months, and implemented as soon as possible, but not later than six months following preparation of the amendment.

(b) Notwithstanding compliance with paragraph (a) of this section, complete a review and evaluation of the SPCC Plan at least once every five years from the date your facility becomes subject to this part; or, if your facility was in operation on or before August 16, 2002, five years from the date your last review was required under this part. As a result of this review and evaluation, you must amend your SPCC Plan within six months of the review to include more effective prevention and control technology if the technology has been field-proven at the time of the review and will significantly reduce the likelihood of a discharge as described in §112.1(b) from the facility. You must implement any amendment as soon as possible, but not later than six months following preparation of any amendment. You must document your completion of the review and evaluation, and must sign a statement as to whether you will amend the Plan, either at the beginning or end of the Plan or in a log or an appendix to the Plan. The following words will suffice, "I have completed review and evaluation of the SPCC Plan for (name of facility) on (date), and will (will not) amend the Plan as a result."

(c) Except as provided in §112.6, have a Professional Engineer certify any technical amendments to your Plan in accordance with §112.3(d).

[67 FR 47140, July 17, 2002, as amended at 71 FR 77291, Dec. 26, 2006; 73 FR 74301, Dec. 5, 2008; 74 FR 58809, Nov. 13, 2009]

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§112.6 Qualified Facilities Plan Requirements.

Qualified facilities meeting the Tier I applicability criteria in §112.3(g)(1) are subject to the requirements in paragraph (a) of this section. Qualified facilities meeting the Tier II applicability criteria in §112.3(g)(2) are subject to the requirements in paragraph (b) of this section.

(a) Tier I Qualified Facilities—(1) Preparation and Self-Certification of the Plan. If you are an owner or operator of a facility that meets the Tier I qualified facility criteria in §112.3(g)(1), you must either: comply with the requirements of paragraph (a)(3) of this section; or prepare and implement a Plan meeting requirements of paragraph (b) of this section; or prepare and implement a Plan meeting the general Plan requirements in §112.7 and applicable requirements in subparts B and C, including having the Plan certified by a Professional Engineer as required under §112.3(d). If you do not follow the appendix G template, you must prepare an equivalent Plan that meets all of the applicable requirements listed in this part, and you must supplement it with a section cross-referencing the location of requirements listed in this part and the equivalent requirements in the other prevention plan. To complete the template in appendix G, you must certify that:

(i) You are familiar with the applicable requirements of 40 CFR part 112;

(ii) You have visited and examined the facility;

(iii) You prepared the Plan in accordance with accepted and sound industry practices and standards;

(iv) You have established procedures for required inspections and testing in accordance with industry inspection and testing standards or recommended practices;

(v) You will fully implement the Plan;

(vi) The facility meets the qualification criteria in §112.3(g)(1);

(vii) The Plan does not deviate from any requirement of this part as allowed by §112.7(a)(2) and 112.7(d) or include measures pursuant to §112.9(c)(6) for produced water containers and any associated piping; and

(viii) The Plan and individual(s) responsible for implementing this Plan have the approval of management, and the facility owner or operator has committed the necessary resources to fully implement this Plan.

(2) Technical Amendments. You must certify any technical amendments to your Plan in accordance with paragraph (a)(1) of this section when there is a change in the facility design, construction, operation, or maintenance that affects its potential for a discharge as described in §112.1(b). If the facility change results in the facility no longer meeting the Tier I qualifying criteria in §112.3(g)(1) because an individual oil storage container capacity exceeds 5,000 U.S. gallons or the facility capacity exceeds 10,000 U.S. gallons in aggregate aboveground storage capacity, within six months following preparation of the amendment, you must either:

(i) Prepare and implement a Plan in accordance with §112.6(b) if you meet the Tier II qualified facility criteria in §112.3(g)(2); or

(ii) Prepare and implement a Plan in accordance with the general Plan requirements in §112.7, and applicable requirements in subparts B and C, including having the Plan certified by a Professional Engineer as required under §112.3(d).

(3) Plan Template and Applicable Requirements. Prepare and implement an SPCC Plan that meets the following requirements under §112.7 and in subparts B and C of this part: introductory paragraph of §§112.7, 112.7(a)(3)(i), 112.7(a)(3)(iv), 112.7(a)(3)(vi), 112.7(a)(4), 112.7(a)(5), 112.7(c), 112.7(e), 112.7(f), 112.7(g), 112.7(k), 112.8(b)(1), 112.8(b)(2), 112.8(c)(1), 112.8(c)(3), 112.8(c)(4), 112.8(c)(5), 112.8(c)(6), 112.8(c)(10), 112.8(d)(4), 112.9(b), 112.9(c)(1), 112.9(c)(2), 112.9(c)(3), 112.9(c)(4), 112.9(c)(5), 112.9(d)(1), 112.9(d)(3), 112.9(d)(4), 112.10(b), 112.10(c), 112.10(d), 112.12(b)(1), 112.12(b)(2), 112.12(c)(1), 112.12(c)(3), 112.12(c)(4), 112.12(c)(5), 112.12(c)(6), 112.12(c)(10), and 112.12(d)(4). The template in appendix G to this part has been developed to meet the requirements of 40 CFR part 112 and, when completed and signed by the owner or operator, may be used as the SPCC Plan. Additionally, you must meet the following requirements:

(i) Failure analysis, in lieu of the requirements in §112.7(b). Where experience indicates a reasonable potential for equipment failure (such as loading or unloading equipment, tank overflow, rupture, or leakage, or any other equipment known to be a source of discharge), include in your Plan a prediction of the direction and total quantity of oil which could be discharged from the facility as a result of each type of major equipment failure.

(ii) Bulk storage container secondary containment, in lieu of the requirements in §§112.8(c)(2) and (c)(11) and 112.12(c)(2) and (c)(11). Construct all bulk storage container installations (except mobile refuelers and other non-transportation-related tank trucks), including mobile or portable oil storage containers, so that you provide a secondary means of containment for the entire capacity of the largest single container plus additional capacity to contain precipitation. Dikes, containment curbs, and pits are commonly employed for this purpose. You may also use an alternative system consisting of a drainage trench enclosure that must be arranged so that any discharge will terminate and be safely confined in a catchment basin or holding pond. Position or locate mobile or portable oil storage containers to prevent a discharge as described in §112.1(b).

(iii) Overfill prevention, in lieu of the requirements in §§112.8(c)(8) and 112.12(c)(8). Ensure that each container is provided with a system or documented procedure to prevent overfills of the container, describe the system or procedure in the SPCC Plan and regularly test to ensure proper operation or efficacy.

(b) Tier II Qualified Facilities—(1) Preparation and Self-Certification of Plan. If you are the owner or operator of a facility that meets the Tier II qualified facility criteria in §112.3(g)(2), you may choose to self-certify your Plan. You must certify in the Plan that:

(i) You are familiar with the requirements of this part;

(ii) You have visited and examined the facility;

(iii) The Plan has been prepared in accordance with accepted and sound industry practices and standards, and with the requirements of this part;

(iv) Procedures for required inspections and testing have been established;

(v) You will fully implement the Plan;

(vi) The facility meets the qualification criteria set forth under §112.3(g)(2);

(vii) The Plan does not deviate from any requirement of this part as allowed by §112.7(a)(2) and 112.7(d) or include measures pursuant to §112.9(c)(6) for produced water containers and any associated piping, except as provided in paragraph (b)(3) of this section; and

(viii) The Plan and individual(s) responsible for implementing the Plan have the full approval of management and the facility owner or operator has committed the necessary resources to fully implement the Plan.

(2) Technical Amendments. If you self-certify your Plan pursuant to paragraph (b)(1) of this section, you must certify any technical amendments to your Plan in accordance with paragraph (b)(1) of this section when there is a change in the facility design, construction, operation, or maintenance that affects its potential for a discharge as described in §112.1(b), except:

(i) If a Professional Engineer certified a portion of your Plan in accordance with paragraph (b)(4) of this section, and the technical amendment affects this portion of the Plan, you must have the amended provisions of your Plan certified by a Professional Engineer in accordance with paragraph (b)(4)(ii) of this section.

(ii) If the change is such that the facility no longer meets the Tier II qualifying criteria in §112.3(g)(2) because it exceeds 10,000 U.S. gallons in aggregate aboveground storage capacity you must, within six months following the change, prepare and implement a Plan in accordance with the general Plan requirements in §112.7 and the applicable requirements in subparts B and C of this part, including having the Plan certified by a Professional Engineer as required under §112.3(d).

(3) Applicable Requirements. Except as provided in this paragraph, your self-certified SPCC Plan must comply with §112.7 and the applicable requirements in subparts B and C of this part:

(i) Environmental Equivalence. Your Plan may not include alternate methods which provide environmental equivalence pursuant to §112.7(a)(2), unless each alternate method has been reviewed and certified in writing by a Professional Engineer, as provided in paragraph (b)(4) of this section.

(ii) Impracticability. Your Plan may not include any determinations that secondary containment is impracticable and provisions in lieu of secondary containment pursuant to §112.7(d), unless each such determination and alternate measure has been reviewed and certified in writing by a Professional Engineer, as provided in paragraph (b)(4) of this section.

(iii) Produced Water Containers. Your Plan may not include any alternative procedures for skimming produced water containers in lieu of sized secondary containment pursuant to §112.9(c)(6), unless they have been reviewed and certified in writing by a Professional Engineer, as provided in paragraph (b)(4) of this section.

(4) Professional Engineer Certification of Portions of a Qualified Facility's Self-Certified Plan.

(i) As described in paragraph (b)(3) of this section, the facility owner or operator may not self-certify alternative measures allowed under §112.7(a)(2) or (d), that are included in the facility's Plan. Such measures must be reviewed and certified, in writing, by a licensed Professional Engineer. For each alternative measure allowed under §112.7(a)(2), the Plan must be accompanied by a written statement by a Professional Engineer that states the reason for nonconformance and describes the alternative method and how it provides equivalent environmental protection in accordance with §112.7(a)(2). For each determination of impracticability of secondary containment pursuant to §112.7(d), the Plan must clearly explain why secondary containment measures are not practicable at this facility and provide the alternative measures required in §112.7(d) in lieu of secondary containment. By certifying each measure allowed under §112.7(a)(2) and (d), the Professional Engineer attests:

(A) That he is familiar with the requirements of this part;

(B) That he or his agent has visited and examined the facility; and

(C) That the alternative method of environmental equivalence in accordance with §112.7(a)(2) or the determination of impracticability and alternative measures in accordance with §112.7(d) is consistent with good engineering practice, including consideration of applicable industry standards, and with the requirements of this part.

(ii) As described in paragraph (b)(3) of this section, the facility owner or operator may not self-certify measures as described in §112.9(c)(6) for produced water containers and any associated piping. Such measures must be reviewed and certified, in writing, by a licensed Professional Engineer, in accordance with §112.3(d)(1)(vi).

(iii) The review and certification by the Professional Engineer under this paragraph is limited to the alternative method which achieves equivalent environmental protection pursuant to §112.7(a)(2); to the impracticability determination and measures in lieu of secondary containment pursuant to §112.7(d); or the measures pursuant to §112.9(c)(6) for produced water containers and any associated piping and appurtenances downstream from the container.

[73 FR 74302, Dec. 5, 2008, as amended at 74 FR 58810, Nov. 13, 2009]

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§112.7 General requirements for Spill Prevention, Control, and Countermeasure Plans.

If you are the owner or operator of a facility subject to this part you must prepare a Plan in accordance with good engineering practices. The Plan must have the full approval of management at a level of authority to commit the necessary resources to fully implement the Plan. You must prepare the Plan in writing. If you do not follow the sequence specified in this section for the Plan, you must prepare an equivalent Plan acceptable to the Regional Administrator that meets all of the applicable requirements listed in this part, and you must supplement it with a section cross-referencing the location of requirements listed in this part and the equivalent requirements in the other prevention plan. If the Plan calls for additional facilities or procedures, methods, or equipment not yet fully operational, you must discuss these items in separate paragraphs, and must explain separately the details of installation and operational start-up. As detailed elsewhere in this section, you must also:

(a)(1) Include a discussion of your facility's conformance with the requirements listed in this part.

(2) Comply with all applicable requirements listed in this part. Except as provided in §112.6, your Plan may deviate from the requirements in paragraphs (g), (h)(2) and (3), and (i) of this section and the requirements in subparts B and C of this part, except the secondary containment requirements in paragraphs (c) and (h)(1) of this section, and §§112.8(c)(2), 112.8(c)(11), 112.9(c)(2), 112.9(d)(3), 112.10(c), 112.12(c)(2), and 112.12(c)(11), where applicable to a specific facility, if you provide equivalent environmental protection by some other means of spill prevention, control, or countermeasure. Where your Plan does not conform to the applicable requirements in

paragraphs (g), (h)(2) and (3), and (i) of this section, or the requirements of subparts B and C of this part, except the secondary containment requirements in paragraph (c) and (h)(1) of this section, and §§112.8(c)(2), 112.8(c)(11), 112.9(c)(2), 112.10(c), 112.12(c)(2), and 112.12(c)(11), you must state the reasons for nonconformance in your Plan and describe in detail alternate methods and how you will achieve equivalent environmental protection. If the Regional Administrator determines that the measures described in your Plan do not provide equivalent environmental protection, he may require that you amend your Plan, following the procedures in §112.4(d) and (e).

(3) Describe in your Plan the physical layout of the facility and include a facility diagram, which must mark the location and contents of each fixed oil storage container and the storage area where mobile or portable containers are located. The facility diagram must identify the location of and mark as “exempt” underground tanks that are otherwise exempted from the requirements of this part under §112.1(d)(4). The facility diagram must also include all transfer stations and connecting pipes, including intra-facility gathering lines that are otherwise exempted from the requirements of this part under §112.1(d)(11). You must also address in your Plan:

(i) The type of oil in each fixed container and its storage capacity. For mobile or portable containers, either provide the type of oil and storage capacity for each container or provide an estimate of the potential number of mobile or portable containers, the types of oil, and anticipated storage capacities;

(ii) Discharge prevention measures including procedures for routine handling of products (loading, unloading, and facility transfers, etc.);

(iii) Discharge or drainage controls such as secondary containment around containers and other structures, equipment, and procedures for the control of a discharge;

(iv) Countermeasures for discharge discovery, response, and cleanup (both the facility's capability and those that might be required of a contractor);

(v) Methods of disposal of recovered materials in accordance with applicable legal requirements; and

(vi) Contact list and phone numbers for the facility response coordinator, National Response Center, cleanup contractors with whom you have an agreement for response, and all appropriate Federal, State, and local agencies who must be contacted in case of a discharge as described in §112.1(b).

(4) Unless you have submitted a response plan under §112.20, provide information and procedures in your Plan to enable a person reporting a discharge as described in §112.1(b) to relate information on the exact address or location and phone number of the facility; the date and time of the discharge, the type of material discharged; estimates of the total quantity discharged; estimates of the quantity discharged as described in §112.1(b); the source of the discharge; a description of all affected media; the cause of the discharge; any damages or injuries caused by the discharge; actions being used to stop, remove, and mitigate the effects of the discharge; whether an evacuation may be needed; and, the names of individuals and/or organizations who have also been contacted.

(5) Unless you have submitted a response plan under §112.20, organize portions of the Plan describing procedures you will use when a discharge occurs in a way that will make them readily usable in an emergency, and include appropriate supporting material as appendices.

(b) Where experience indicates a reasonable potential for equipment failure (such as loading or unloading equipment, tank overflow, rupture, or leakage, or any other equipment known to be a source of a discharge), include in your Plan a prediction of the direction, rate of flow, and total quantity of oil which could be discharged from the facility as a result of each type of major equipment failure.

(c) Provide appropriate containment and/or diversionary structures or equipment to prevent a discharge as described in §112.1(b), except as provided in paragraph (k) of this section for qualified oil-filled operational equipment, and except as provided in §112.9(d)(3) for flowlines and intra-facility gathering lines at an oil production facility. The entire containment system, including walls and floor, must be capable of containing oil and must be constructed so that any discharge from a primary containment system, such as a tank, will not escape the containment system before cleanup occurs. In determining the method, design, and capacity for secondary containment, you need only to address the typical failure mode, and the most likely quantity of oil that would be discharged. Secondary containment may be either active or passive in design. At a minimum, you must use one of the following prevention systems or its equivalent:

(1) For onshore facilities:

(i) Dikes, berms, or retaining walls sufficiently impervious to contain oil;

(ii) Curbing or drip pans;

(iii) Sumps and collection systems;

(iv) Culverting, gutters, or other drainage systems;

(v) Weirs, booms, or other barriers;

(vi) Spill diversion ponds;

(vii) Retention ponds; or

(viii) Sorbent materials.

(2) For offshore facilities:

(i) Curbing or drip pans; or

(ii) Sumps and collection systems.

(d) Provided your Plan is certified by a licensed Professional Engineer under §112.3(d), or, in the case of a qualified facility that meets the criteria in §112.3(g), the relevant sections of your Plan are certified by a licensed Professional Engineer under §112.6(d), if you determine that the installation of any of the structures or pieces of equipment listed in paragraphs (c) and (h)(1) of this section, and §§112.8(c)(2), 112.8(c)(11), 112.9(c)(2), 112.10(c), 112.12(c)(2), and 112.12(c)(11) to prevent a discharge as described in §112.1(b) from any onshore or offshore facility is not practicable, you must clearly explain in your Plan why such measures are not practicable; for bulk storage containers, conduct both periodic integrity testing of the containers and periodic integrity and leak testing of the valves and piping; and, unless you have submitted a response plan under §112.20, provide in your Plan the following:

(1) An oil spill contingency plan following the provisions of part 109 of this chapter.

(2) A written commitment of manpower, equipment, and materials required to expeditiously control and remove any quantity of oil discharged that may be harmful.

(e) Inspections, tests, and records. Conduct inspections and tests required by this part in accordance with written procedures that you or the certifying engineer develop for the facility. You must keep these written procedures and a record of the inspections and tests, signed by the appropriate supervisor or inspector, with the SPCC Plan for a period of three years. Records of inspections and tests kept under usual and customary business practices will suffice for purposes of this paragraph.

(f) Personnel, training, and discharge prevention procedures. (1) At a minimum, train your oil-handling personnel in the operation and maintenance of equipment to prevent discharges; discharge procedure protocols; applicable pollution control laws, rules, and regulations; general facility operations; and, the contents of the facility SPCC Plan.

(2) Designate a person at each applicable facility who is accountable for discharge prevention and who reports to facility management.

(3) Schedule and conduct discharge prevention briefings for your oil-handling personnel at least once a year to assure adequate understanding of the SPCC Plan for that facility. Such briefings must highlight and describe known discharges as described in §112.1(b) or failures, malfunctioning components, and any recently developed precautionary measures.

(g) Security (excluding oil production facilities). Describe in your Plan how you secure and control access to the oil handling, processing and storage areas; secure master flow and drain valves; prevent unauthorized access to starter controls on oil pumps; secure out-of-service and loading/unloading connections of oil pipelines; and address the appropriateness of security lighting to both prevent acts of vandalism and assist in the discovery of oil discharges.

(h) Facility tank car and tank truck loading/unloading rack (excluding offshore facilities). (1) Where loading/unloading rack drainage does not flow into a catchment basin or treatment facility designed to handle discharges, use a quick drainage system for tank car or tank truck loading/unloading racks. You must design any containment system to hold at least the maximum capacity of any single compartment of a tank car or tank truck loaded or unloaded at the facility.

(2) Provide an interlocked warning light or physical barrier system, warning signs, wheel chocks or vehicle brake interlock system in the area adjacent to a loading/unloading rack, to prevent vehicles from departing before complete disconnection of flexible or fixed oil transfer lines.

(3) Prior to filling and departure of any tank car or tank truck, closely inspect for discharges the lowermost drain and all outlets of such vehicles, and if necessary, ensure that they are tightened, adjusted, or replaced to prevent liquid discharge while in transit.

(i) If a field-constructed aboveground container undergoes a repair, alteration, reconstruction, or a change in service that might affect the risk of a discharge or failure due to brittle fracture or other catastrophe, or has discharged oil or failed due to brittle fracture failure or other catastrophe, evaluate the container for risk of discharge or failure due to brittle fracture or other catastrophe, and as necessary, take appropriate action.

(j) In addition to the minimal prevention standards listed under this section, include in your Plan a complete discussion of conformance with the applicable requirements and other effective discharge prevention and containment procedures listed in this part or any applicable more stringent State rules, regulations, and guidelines.

(k) Qualified Oil-filled Operational Equipment. The owner or operator of a facility with oil-filled operational equipment that meets the qualification criteria in paragraph (k)(1) of this sub-section may choose to implement for this qualified oil-filled operational equipment the alternate requirements as described in paragraph (k)(2) of this sub-section in lieu of general secondary containment required in paragraph (c) of this section.

(1) Qualification Criteria—Reportable Discharge History: The owner or operator of a facility that has had no single discharge as described in §112.1(b) from any oil-filled operational equipment exceeding 1,000 U.S. gallons or no two discharges as described in §112.1(b) from any oil-filled operational equipment each exceeding 42 U.S. gallons within any twelve month period in the three years prior to the SPCC Plan certification date, or since becoming subject to this part if the facility has been in operation for less than three years (other than oil discharges as described in §112.1(b) that are the result of natural disasters, acts of war or terrorism); and

(2) Alternative Requirements to General Secondary Containment. If secondary containment is not provided for qualified oil-filled operational equipment pursuant to paragraph (c) of this section, the owner or operator of a facility with qualified oil-filled operational equipment must:

(i) Establish and document the facility procedures for inspections or a monitoring program to detect equipment failure and/or a discharge; and

(ii) Unless you have submitted a response plan under §112.20, provide in your Plan the following:

(A) An oil spill contingency plan following the provisions of part 109 of this chapter.

(B) A written commitment of manpower, equipment, and materials required to expeditiously control and remove any quantity of oil discharged that may be harmful.

[67 FR 47140, July 17, 2002, as amended at 71 FR 77292, Dec. 26, 2006; 73 FR 74303, Dec. 5, 2008; 74 FR 58810, Nov. 13, 2009]

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Subpart B—Requirements for Petroleum Oils and Non-Petroleum Oils, Except Animal Fats and Oils and Greases, and Fish and Marine Mammal Oils; and Vegetable Oils (Including Oils from Seeds, Nuts, Fruits, and Kernels)

Source: 67 FR 47146, July 17, 2002, unless otherwise noted.

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§112.8 Spill Prevention, Control, and Countermeasure Plan requirements for onshore facilities (excluding production facilities).

If you are the owner or operator of an onshore facility (excluding a production facility), you must:

(a) Meet the general requirements for the Plan listed under §112.7, and the specific discharge prevention and containment procedures listed in this section.

(b) Facility drainage. (1) Restrain drainage from diked storage areas by valves to prevent a discharge into the drainage system or facility effluent treatment system, except where facility systems are designed to control such discharge. You may empty diked areas by pumps or ejectors; however, you must manually activate these pumps or ejectors and must inspect the condition of the accumulation before starting, to ensure no oil will be discharged.

(2) Use valves of manual, open-and-closed design, for the drainage of diked areas. You may not use flapper-type drain valves to drain diked areas. If your facility drainage drains directly into a watercourse and not into an on-site wastewater treatment plant, you must inspect and may drain uncontaminated retained stormwater, as provided in paragraphs (c)(3)(ii), (iii), and (iv) of this section.

(3) Design facility drainage systems from undiked areas with a potential for a discharge (such as where piping is located outside containment walls or where tank truck discharges may occur outside the loading area) to flow into ponds, lagoons, or catchment basins designed to retain oil or return it to the facility. You must not locate catchment basins in areas subject to periodic flooding.

(4) If facility drainage is not engineered as in paragraph (b)(3) of this section, equip the final discharge of all ditches inside the facility with a diversion system that would, in the event of an uncontrolled discharge, retain oil in the facility.

(5) Where drainage waters are treated in more than one treatment unit and such treatment is continuous, and pump transfer is needed, provide two “lift” pumps and permanently install at least one of the pumps. Whatever techniques you use, you must engineer facility drainage systems to prevent a discharge as described in §112.1(b) in case there is an equipment failure or human error at the facility.

(c) Bulk storage containers. (1) Not use a container for the storage of oil unless its material and construction are compatible with the material stored and conditions of storage such as pressure and temperature.

(2) Construct all bulk storage tank installations (except mobile refuelers and other non-transportation-related tank trucks) so that you provide a secondary means of containment for the entire capacity of the largest single container and sufficient freeboard to contain precipitation. You must ensure that diked areas are sufficiently impervious to contain discharged oil. Dikes, containment curbs, and pits are commonly employed for this purpose. You may also use an alternative system consisting of a drainage trench enclosure that must be arranged so that any discharge will terminate and be safely confined in a facility catchment basin or holding pond.

(3) Not allow drainage of uncontaminated rainwater from the diked area into a storm drain or discharge of an effluent into an open watercourse, lake, or pond, bypassing the facility treatment system unless you:

(i) Normally keep the bypass valve sealed closed.

(ii) Inspect the retained rainwater to ensure that its presence will not cause a discharge as described in §112.1(b).

(iii) Open the bypass valve and reseal it following drainage under responsible supervision; and

(iv) Keep adequate records of such events, for example, any records required under permits issued in accordance with §§122.41(j)(2) and 122.41(m)(3) of this chapter.

(4) Protect any completely buried metallic storage tank installed on or after January 10, 1974 from corrosion by coatings or cathodic protection compatible with local soil conditions. You must regularly leak test such completely buried metallic storage tanks.

(5) Not use partially buried or bunkered metallic tanks for the storage of oil, unless you protect the buried section of the tank from corrosion. You must protect partially buried and bunkered tanks from corrosion by coatings or cathodic protection compatible with local soil conditions.

(6) Test or inspect each aboveground container for integrity on a regular schedule and whenever you make

material repairs. You must determine, in accordance with industry standards, the appropriate qualifications for personnel performing tests and inspections, the frequency and type of testing and inspections, which take into account container size, configuration, and design (such as containers that are: shop-built, field-erected, skid-mounted, elevated, equipped with a liner, double-walled, or partially buried). Examples of these integrity tests include, but are not limited to: visual inspection, hydrostatic testing, radiographic testing, ultrasonic testing, acoustic emissions testing, or other systems of non-destructive testing. You must keep comparison records and you must also inspect the container's supports and foundations. In addition, you must frequently inspect the outside of the container for signs of deterioration, discharges, or accumulation of oil inside diked areas. Records of inspections and tests kept under usual and customary business practices satisfy the recordkeeping requirements of this paragraph.

(7) Control leakage through defective internal heating coils by monitoring the steam return and exhaust lines for contamination from internal heating coils that discharge into an open watercourse, or pass the steam return or exhaust lines through a settling tank, skimmer, or other separation or retention system.

(8) Engineer or update each container installation in accordance with good engineering practice to avoid discharges. You must provide at least one of the following devices:

(i) High liquid level alarms with an audible or visual signal at a constantly attended operation or surveillance station. In smaller facilities an audible air vent may suffice.

(ii) High liquid level pump cutoff devices set to stop flow at a predetermined container content level.

(iii) Direct audible or code signal communication between the container gauger and the pumping station.

(iv) A fast response system for determining the liquid level of each bulk storage container such as digital computers, telepulse, or direct vision gauges. If you use this alternative, a person must be present to monitor gauges and the overall filling of bulk storage containers.

(v) You must regularly test liquid level sensing devices to ensure proper operation.

(9) Observe effluent treatment facilities frequently enough to detect possible system upsets that could cause a discharge as described in §112.1(b).

(10) Promptly correct visible discharges which result in a loss of oil from the container, including but not limited to seams, gaskets, piping, pumps, valves, rivets, and bolts. You must promptly remove any accumulations of oil in diked areas.

(11) Position or locate mobile or portable oil storage containers to prevent a discharge as described in §112.1(b). Except for mobile refuelers and other non-transportation-related tank trucks, you must furnish a secondary means of containment, such as a dike or catchment basin, sufficient to contain the capacity of the largest single compartment or container with sufficient freeboard to contain precipitation.

(d) Facility transfer operations, pumping, and facility process. (1) Provide buried piping that is installed or replaced on or after August 16, 2002, with a protective wrapping and coating. You must also cathodically protect such buried piping installations or otherwise satisfy the corrosion protection standards for piping in part 280 of this chapter or a State program approved under part 281 of this chapter. If a section of buried line is exposed for any reason, you must carefully inspect it for deterioration. If you find corrosion damage, you must undertake additional examination and corrective action as indicated by the magnitude of the damage.

(2) Cap or blank-flange the terminal connection at the transfer point and mark it as to origin when piping is not in service or is in standby service for an extended time.

(3) Properly design pipe supports to minimize abrasion and corrosion and allow for expansion and contraction.

(4) Regularly inspect all aboveground valves, piping, and appurtenances. During the inspection you must assess the general condition of items, such as flange joints, expansion joints, valve glands and bodies, catch pans, pipeline supports, locking of valves, and metal surfaces. You must also conduct integrity and leak testing of buried piping at the time of installation, modification, construction, relocation, or replacement.

(5) Warn all vehicles entering the facility to be sure that no vehicle will endanger aboveground piping or other oil transfer operations.

[67 FR 47146, July 17, 2002, as amended at 71 FR 77293, Dec. 26, 2006; 73 FR 74304, Dec. 5, 2008]

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§112.9 Spill Prevention, Control, and Countermeasure Plan Requirements for onshore oil production facilities (excluding drilling and workover facilities).

If you are the owner or operator of an onshore oil production facility (excluding a drilling or workover facility), you must:

(a) Meet the general requirements for the Plan listed under §112.7, and the specific discharge prevention and containment procedures listed under this section.

(b) Oil production facility drainage. (1) At tank batteries and separation and treating areas where there is a reasonable possibility of a discharge as described in §112.1(b), close and seal at all times drains of dikes or drains of equivalent measures required under §112.7(c)(1), except when draining uncontaminated rainwater. Prior to drainage, you must inspect the diked area and take action as provided in §112.8(c)(3)(ii), (iii), and (iv). You must remove accumulated oil on the rainwater and return it to storage or dispose of it in accordance with legally approved methods.

(2) Inspect at regularly scheduled intervals field drainage systems (such as drainage ditches or road ditches), and oil traps, sumps, or skimmers, for an accumulation of oil that may have resulted from any small discharge. You must promptly remove any accumulations of oil.

(c) Oil production facility bulk storage containers. (1) Not use a container for the storage of oil unless its material and construction are compatible with the material stored and the conditions of storage.

(2) Except as described in paragraph (c)(5) of this section for flow-through process vessels and paragraph (c)(6) of this section for produced water containers and any associated piping and appurtenances downstream from the container, construct all tank battery, separation, and treating facility installations, so that you provide a secondary means of containment for the entire capacity of the largest single container and sufficient freeboard to contain precipitation. You must safely confine drainage from undiked areas in a catchment basin or holding pond.

(3) Except as described in paragraph (c)(5) of this section for flow-through process vessels and paragraph (c)(6) of this section for produced water containers and any associated piping and appurtenances downstream from the container, periodically and upon a regular schedule visually inspect each container of oil for deterioration and maintenance needs, including the foundation and support of each container that is on or above the surface of the ground.

(4) Engineer or update new and old tank battery installations in accordance with good engineering practice to prevent discharges. You must provide at least one of the following:

(i) Container capacity adequate to assure that a container will not overfill if a pumper/gauger is delayed in making regularly scheduled rounds.

(ii) Overflow equalizing lines between containers so that a full container can overflow to an adjacent container.

(iii) Vacuum protection adequate to prevent container collapse during a pipeline run or other transfer of oil from the container.

(iv) High level sensors to generate and transmit an alarm signal to the computer where the facility is subject to a computer production control system.

(5) Flow-through process vessels. The owner or operator of a facility with flow-through process vessels may choose to implement the alternate requirements as described below in lieu of sized secondary containment required in paragraphs (c)(2) and (c)(3) of this section.

(i) Periodically and on a regular schedule visually inspect and/or test flow-through process vessels and associated components (such as dump valves) for leaks, corrosion, or other conditions that could lead to a discharge as described in §112.1(b).

(ii) Take corrective action or make repairs to flow-through process vessels and any associated components as indicated by regularly scheduled visual inspections, tests, or evidence of an oil discharge.

(iii) Promptly remove or initiate actions to stabilize and remediate any accumulations of oil discharges associated with flow-through process vessels.

(iv) If your facility discharges more than 1,000 U.S. gallons of oil in a single discharge as described in §112.1(b), or discharges more than 42 U.S. gallons of oil in each of two discharges as described in §112.1(b) within any twelve month period, from flow-through process vessels (excluding discharges that are the result of natural disasters, acts of war, or terrorism) then you must, within six months from the time the facility becomes subject to this paragraph, ensure that all flow-through process vessels subject to this subpart comply with §112.9(c)(2) and (c)(3).

(6) Produced water containers. For each produced water container, comply with §112.9(c)(1) and (c)(4); and §112.9(c)(2) and (c)(3), or comply with the provisions of the following paragraphs (c)(6)(i) through (v):

(i) Implement, on a regular schedule, a procedure for each produced water container that is designed to separate the free-phase oil that accumulates on the surface of the produced water. Include in the Plan a description of the procedures, frequency, amount of free-phase oil expected to be maintained inside the container, and a Professional Engineer certification in accordance with §112.3(d)(1)(vi). Maintain records of such events in accordance with §112.7(e). Records kept under usual and customary business practices will suffice for purposes of this paragraph. If this procedure is not implemented as described in the Plan or no records are maintained, then you must comply with §112.9(c)(2) and (c)(3).

(ii) On a regular schedule, visually inspect and/or test the produced water container and associated piping for leaks, corrosion, or other conditions that could lead to a discharge as described in §112.1(b) in accordance with good engineering practice.

(iii) Take corrective action or make repairs to the produced water container and any associated piping as indicated by regularly scheduled visual inspections, tests, or evidence of an oil discharge.

(iv) Promptly remove or initiate actions to stabilize and remediate any accumulations of oil discharges associated with the produced water container.

(v) If your facility discharges more than 1,000 U.S. gallons of oil in a single discharge as described in §112.1(b), or discharges more than 42 U.S. gallons of oil in each of two discharges as described in §112.1(b) within any twelve month period from a produced water container subject to this subpart (excluding discharges that are the result of natural disasters, acts of war, or terrorism) then you must, within six months from the time the facility becomes subject to this paragraph, ensure that all produced water containers subject to this subpart comply with §112.9(c)(2) and (c)(3).

(d) Facility transfer operations, oil production facility. (1) Periodically and upon a regular schedule inspect all aboveground valves and piping associated with transfer operations for the general condition of flange joints, valve glands and bodies, drip pans, pipe supports, pumping well polish rod stuffing boxes, bleeder and gauge valves, and other such items.

(2) Inspect saltwater (oil field brine) disposal facilities often, particularly following a sudden change in atmospheric temperature, to detect possible system upsets capable of causing a discharge.

(3) For flowlines and intra-facility gathering lines that are not provided with secondary containment in accordance with §112.7(c), unless you have submitted a response plan under §112.20, provide in your Plan the following:

(i) An oil spill contingency plan following the provisions of part 109 of this chapter.

(ii) A written commitment of manpower, equipment, and materials required to expeditiously control and remove any quantity of oil discharged that might be harmful.

(4) Prepare and implement a written program of flowline/intra-facility gathering line maintenance. The maintenance program must address your procedures to:

(i) Ensure that flowlines and intra-facility gathering lines and associated valves and equipment are compatible with the type of production fluids, their potential corrosivity, volume, and pressure, and other conditions expected in the operational environment.

(ii) Visually inspect and/or test flowlines and intra-facility gathering lines and associated appurtenances on a periodic and regular schedule for leaks, oil discharges, corrosion, or other conditions that could lead to a discharge as described in §112.1(b). For flowlines and intra-facility gathering lines that are not provided with secondary containment in accordance with §112.7(c), the frequency and type of testing must allow for the implementation of a contingency plan as described under part 109 of this chapter.

(iii) Take corrective action or make repairs to any flowlines and intra-facility gathering lines and associated appurtenances as indicated by regularly scheduled visual inspections, tests, or evidence of a discharge.

(iv) Promptly remove or initiate actions to stabilize and remediate any accumulations of oil discharges associated with flowlines, intra-facility gathering lines, and associated appurtenances.

[73 FR, 74304, Dec. 5, 2008, as amended at 74 FR 58810, Nov. 13, 2009]

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§112.10 Spill Prevention, Control, and Countermeasure Plan requirements for onshore oil drilling and workover facilities.

If you are the owner or operator of an onshore oil drilling and workover facility, you must:

(a) Meet the general requirements listed under §112.7, and also meet the specific discharge prevention and containment procedures listed under this section.

(b) Position or locate mobile drilling or workover equipment so as to prevent a discharge as described in §112.1(b).

(c) Provide catchment basins or diversion structures to intercept and contain discharges of fuel, crude oil, or oily drilling fluids.

(d) Install a blowout prevention (BOP) assembly and well control system before drilling below any casing string or during workover operations. The BOP assembly and well control system must be capable of controlling any well-head pressure that may be encountered while that BOP assembly and well control system are on the well.

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§112.11 Spill Prevention, Control, and Countermeasure Plan requirements for offshore oil drilling, production, or workover facilities.

If you are the owner or operator of an offshore oil drilling, production, or workover facility, you must:

(a) Meet the general requirements listed under §112.7, and also meet the specific discharge prevention and containment procedures listed under this section.

(b) Use oil drainage collection equipment to prevent and control small oil discharges around pumps, glands, valves, flanges, expansion joints, hoses, drain lines, separators, treaters, tanks, and associated equipment. You must control and direct facility drains toward a central collection sump to prevent the facility from having a discharge as described in §112.1(b). Where drains and sumps are not practicable, you must remove oil contained in collection equipment as often as necessary to prevent overflow.

(c) For facilities employing a sump system, provide adequately sized sump and drains and make available a spare pump to remove liquid from the sump and assure that oil does not escape. You must employ a regularly scheduled preventive maintenance inspection and testing program to assure reliable operation of the liquid removal system and pump start-up device. Redundant automatic sump pumps and control devices may be required on some installations.

(d) At facilities with areas where separators and treaters are equipped with dump valves which predominantly fail in the closed position and where pollution risk is high, specially equip the facility to prevent the discharge of oil. You must prevent the discharge of oil by:

(1) Extending the flare line to a diked area if the separator is near shore;

(2) Equipping the separator with a high liquid level sensor that will automatically shut in wells producing to the separator; or

(3) Installing parallel redundant dump valves.

(e) Equip atmospheric storage or surge containers with high liquid level sensing devices that activate an alarm or control the flow, or otherwise prevent discharges.

(f) Equip pressure containers with high and low pressure sensing devices that activate an alarm or control the flow.

(g) Equip containers with suitable corrosion protection.

(h) Prepare and maintain at the facility a written procedure within the Plan for inspecting and testing pollution prevention equipment and systems.

(i) Conduct testing and inspection of the pollution prevention equipment and systems at the facility on a scheduled periodic basis, commensurate with the complexity, conditions, and circumstances of the facility and any other appropriate regulations. You must use simulated discharges for testing and inspecting human and equipment pollution control and countermeasure systems.

(j) Describe in detailed records surface and subsurface well shut-in valves and devices in use at the facility for each well sufficiently to determine their method of activation or control, such as pressure differential, change in fluid or flow conditions, combination of pressure and flow, manual or remote control mechanisms.

(k) Install a BOP assembly and well control system during workover operations and before drilling below any casing string. The BOP assembly and well control system must be capable of controlling any well-head pressure that may be encountered while the BOP assembly and well control system are on the well.

(l) Equip all manifolds (headers) with check valves on individual flowlines.

(m) Equip the flowline with a high pressure sensing device and shut-in valve at the wellhead if the shut-in well pressure is greater than the working pressure of the flowline and manifold valves up to and including the header valves. Alternatively you may provide a pressure relief system for flowlines.

(n) Protect all piping appurtenant to the facility from corrosion, such as with protective coatings or cathodic protection.

(o) Adequately protect sub-marine piping appurtenant to the facility against environmental stresses and other activities such as fishing operations.

(p) Maintain sub-marine piping appurtenant to the facility in good operating condition at all times. You must periodically and according to a schedule inspect or test such piping for failures. You must document and keep a record of such inspections or tests at the facility.

APPENDIX B

SPILL SPREAD AND FLOW CALCULATIONS

SPILL SPREAD AND FLOW CALCULATIONS

A. Spill Spread

The following assumptions were used in the calculation of the spill flow rate and spill radius:

- a release of oil consists of the maximum total volume of the unit;
- the oil migrates in a 180-degree radius from the unit (if unconstrained by permanent site features);
- the slope in the vicinity of each oil-filled unit is topographically flat;
- on gravel and landscaped surfaces, oil saturates the gravel or the surficial soils and does not infiltrate the subsurface soils. Migrating oil reaches equilibrium at an average depth of 1 inch (zero flow rate);
- on impervious surfaces, the oil spread reaches equilibrium at 0.25-inch thickness (zero flow rate); and
- a porosity of 30 percent was assumed when estimating the potential infiltration of the release to the subsurface (gravel and landscaped areas).

Given these assumptions, the following formulae were used to calculate oil migration distances:

<u>Gravel/Landscaped Surfaces</u>

Where: V = volume of oil (gallons)
0.3 = 30 percent void space
1/12 = 1-inch zero flow rate converted to feet (feet)
7.48 = conversion constant (gallons to cubic feet)
$\pi = 3.14$

Impervious Surfaces

$$Spill\ radius\ (feet) = \sqrt{\frac{2V}{(\frac{0.25}{12})(7.48)\pi}}$$

Where: 0.25/12 = 0.25-inch zero flow rate converted to feet (feet)

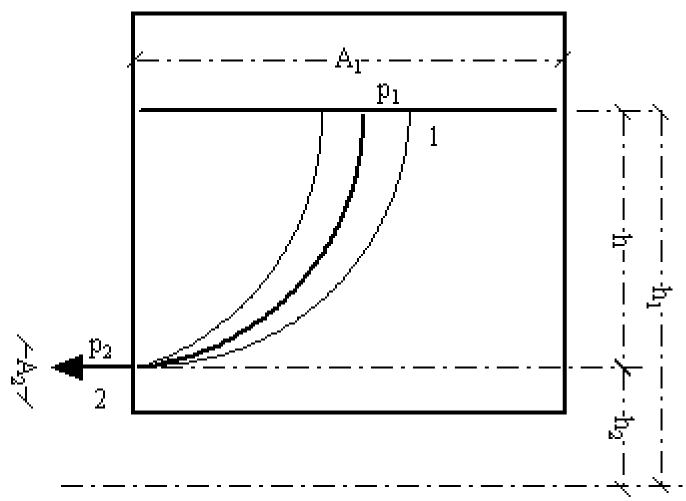
Once the oil is spilled, the horizontal migration rate is slow where the ground surface is flat or is gravel-covered. The migration rate depends on the quantity and flow rate of the spill, variations in the surrounding slope of the ground surface, and obstacles that may modify the migration pattern. The migration rate will also decrease as the oil spreads and the pressure and temperature gradients decrease.

B. Flow Rate Calculation

Flow rate of liquids from an AST through an orifice are calculated using the Bernoulli equation as streamline from the surface (1) to the orifice (2) as depicted in the figure below. First the velocity of the liquid is calculated, and then it is multiplied by the area of the orifice:

Where:

A = area
p = pressure
h = height



Conservative velocity is calculated for tanks that are vented or are open to the atmosphere (i.e., the pressure inside and outside the tank are approximately equal). The following formula is used to calculate conservative velocity:

$$V2 = \sqrt{2 \cdot g \cdot h}$$

Where: V2 = velocity (meters/second) (m/s)
g = gravity (9.81 meters/second^2) (m/s^2)
h = height (meters) (m)

For example, the conservative velocity for the 1,000-gallon AST, which is approximately 68 inches (1.73 meters) tall, is calculated as follows:

$$V2 = \sqrt{2 * 9.81 * 1.73} = 5.83 \text{ m/s}$$

Because of friction, the velocity will be lower than the theoretical example presented above. Therefore, friction coefficient of discharge "c" is used to calculate the effect of friction on the flow rate from the AST. To account for the friction, the velocity formula presented above is modified as follows:

$$V2 = c\sqrt{2 \cdot g \cdot h}$$

A friction coefficient of discharge for a sharp-edged opening is typically 0.6. For a smooth opening, the friction coefficient typically ranges from 0.95 to 1. A value of 0.6 was selected because it was assumed that the opening would have a sharp edge that is common for punctures.

For example, the velocity from the 1,000-gallon AST with friction is calculated as follows:

$$V2 = 0.6\sqrt{2 * 9.81 * 1.73} = 3.50 \text{ m/s}$$

Once the velocity is obtained, the flow rate can be calculated by multiplying the velocity by the area of the most likely puncture hole. For these calculations, a hole with an area of 0.05 square feet was used.

Flow Rate (gallons/minute) = V2 * A * 7.48 * 60 * 3.28

Where: V2 = velocity assuming friction (m/s)
A = Area of the hole (square feet) (ft^2)
7.48 = conversion constant (gallons to cubic feet)
60 = conversion constant (seconds to minutes)
3.28 = conversion constant (meters to feet)

For example, the flow rate from the 1,000-gallon AST with friction is calculated as follows:

Flow Rate = 3.50 * 0.05 * 7.48 * 60 * 3.28 = 258 gallons/minute

Flow Rate/Oil Spread Distance Calculations

Depiction on Site Plan	Capacity (gal)	Tank Orientation	Height of Tank (m)	Gravity	Puncture Area (ft^2)	V2 (m/sec)	Discharge Coefficient	V2, Assuming Friction (m/sec)	Flow Rate (gal/min)	Discharge Assuming Friction Coefficient (gal/min)	Zero Flow Rate (inches)	Spill Radius (ft)
Qualifying Containers												
Tank 1 Heliport (for Emergency Generator)	9,600	Horizontal	1.68	9.81	0.05	5.74	0.6	3.44	423	254	0.25	198
Tank 2 Heliport (for Emergency Generator)	3,000	Horizontal	0.61	9.81	0.05	3.46	0.6	2.08	255	153	0.25	111
Tank 3 (Heliport)	6,000	Vertical	2.74	9.81	0.05	7.33	0.6	4.40	540	324	0.25	157
Tank 4 (Power Plant)	84,000	Horizontal	3.66	9.81	0.05	8.47	0.6	5.08	624	374	0.25	586
Tank 5 (Power Plant)	84,000	Horizontal	3.66	9.81	0.05	8.47	0.6	5.08	624	374	0.25	586
Tank 6 (Power Plant)	84,000	Horizontal	3.66	9.81	0.05	8.47	0.6	5.08	624	374	0.25	586
Tank 7 (Power Plant)	84,000	Horizontal	3.66	9.81	0.05	8.47	0.6	5.08	624	374	0.25	586
Tank 8 (Power Plant)	84,000	Horizontal	3.66	9.81	0.05	8.47	0.6	5.08	624	374	0.25	586
Tank 9 (Diesel) (Vehicle Fueling Area)	4,000	Horizontal	2.67	9.81	0.05	7.24	0.6	4.34	533	320	0.25	128
Tank 9 (Gasoline) (Vehicle Fueling Area)	2,000	Horizontal	2.67	9.81	0.05	7.24	0.6	4.34	533	320	0.25	90
Tank 10 (Vehicle Fueling Area)	100	Horizontal	0.61	9.81	0.05	3.46	0.6	2.08	255	153	0.25	20
Tank 11 (Ambulatory Care Center)	3,000	Horizontal	1.22	9.81	0.05	4.89	0.6	2.94	360	216	0.25	111

Depiction on Site Plan	Capacity (gal)	Tank Orientation	Height of Tank (m)	Gravity	Puncture Area (ft^2)	V2 (m/sec)	Discharge Coefficient	V2, Assuming Friction (m/sec)	Flow Rate (gal/min)	Discharge Assuming Friction Coefficient (gal/min)	Zero Flow Rate (inches)	Spill Radius (ft)
Qualifying Containers												
Drum Storage (Albert Sherman Center in Room AS1-2020)	110	Vertical	0.91	9.81	0.05	4.23	0.6	2.54	311	187	0.25	21
Drum Storage (Bunker)	1,155	Vertical	3.0	0.91	9.81	0.05	4.23	0.6	2.54	311	187	0.25
Outdoor Transformer 1 (Adjacent to Power Plant)	1,376	NA	2.74	9.81	0.05	7.33	0.6	4.40	540	324	0.25	75
Outdoor Transformer 2 (Adjacent to Power Plant)	1,294	NA	2.74	9.81	0.05	7.33	0.6	4.40	540	324	0.25	73
Transformer TSI-001 (Clinical 1 on School Level A)	320	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	36
Transformer TSI-002 (Clinical 1 on School Level A)	320	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	36
Transformer TSI-005 (Basic #1 on School Level A)	320	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	36
Transformer TSI-006 (Basic #1 on School Level A)	320	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	36
Transformer TSI-007 (Student Lab 2 on School Level 8)	380	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	39

Depiction on Site Plan	Capacity (gal)	Tank Orientation	Height of Tank (m)	Gravity	Puncture Area (ft^2)	V2 (m/sec)	Discharge Coefficient	V2, Assuming Friction (m/sec)	Flow Rate (gal/min)	Discharge Assuming Friction Coefficient (gal/min)	Zero Flow Rate (inches)	Spill Radius (ft)
Qualifying Containers												
Transformer TSI-008 (Student Lab 2 on School Level 8)	380	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	39
Transformer TSI-009 (Basic #2 on School Level 8)	380	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	39
Transformer TSI-010 (Basic #2 on School Level 8)	380	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	39
Transformer TSI-011 (Clinical 2 on School Level 8)	380	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	39
Transformer TSI-012 (Clinical 2 on School Level 8)	380	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	39
Transformer TSI-013 (Sub SS-4 on Hospital Level 9)	360	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	38
Transformer TSI-014 (Sub SS-2 on Hospital Level 9)	325	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	36
Transformer TSI-015 (Sub SS-2 on Hospital Level 9)	325	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	36
Transformer TSI-016 (Sub SS-1 on Hospital Level 9)	360	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	38

Depiction on Site Plan	Capacity (gal)	Tank Orientation	Height of Tank (m)	Gravity	Puncture Area (ft^2)	V2 (m/sec)	Discharge Coefficient	V2, Assuming Friction (m/sec)	Flow Rate (gal/min)	Discharge Assuming Friction Coefficient (gal/min)	Zero Flow Rate (inches)	Spill Radius (ft)
Qualifying Containers												
Transformer TSI-017 (Sub SS-1 on Hospital Level 9)	360	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	38
Transformer TSI-018 (Sub SS-5 on Hospital Level 9)	180	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	27
Transformer TSI-019 (Sub SS-3 on Hospital Level 9)	325	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	36
Transformer 1 (Ambulatory Care Center)	389	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	40
Transformer 2 (Ambulatory Care Center)	353	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	38
Generator at Biotech 4	1,000	NA	0.64	9.81	0.05	3.53	0.6	2.12	260	156	0.25	64
Life Flight Air Ambulance Helicopter (Heliport Garage)	187	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	28
Generators G1 (Power Plant First Floor)	300	NA	0.28	9.81	0.05	2.34	0.6	1.40	172	103	0.25	35
Generators G2 (Power Plant First Floor)	300	NA	0.28	9.81	0.05	2.34	0.6	1.40	172	103	0.25	35

Depiction on Site Plan	Capacity (gal)	Tank Orientation	Height of Tank (m)	Gravity	Puncture Area (ft^2)	V2 (m/sec)	Discharge Coefficient	V2, Assuming Friction (m/sec)	Flow Rate (gal/min)	Discharge Assuming Friction Coefficient (gal/min)	Zero Flow Rate (inches)	Spill Radius (ft)
Qualifying Containers												
Generators G1 Hydraulic Skid (Power Plant First Floor)	60	NA	0.30	9.81	0.05	2.45	0.6	1.47	180	108	0.25	16
Generators G2 Hydraulic Skid (Power Plant First Floor)	60	NA	0.30	9.81	0.05	2.45	0.6	1.47	180	108	0.25	16
Generator G3 (Power Plant First Floor)	650	NA	0.60	9.81	0.05	3.42	0.6	2.05	252	151	0.25	52
Chiller 4 Murray Turbine (Power Plant First Floor)	75	NA	0.38	9.81	0.05	2.73	0.6	1.64	201	121	0.25	18
Chiller 5 York Compressor (Power Plant First Floor)	55	NA	0.30	9.81	0.05	2.45	0.6	1.47	180	108	0.25	15
Solar CTG (Power Plant First Floor)	739	NA	0.75	9.81	0.05	3.83	0.6	2.30	282	169	0.25	55
Enerflex Gas Compressor (Power Plant First Floor)	135	NA	0.34	9.81	0.05	2.59	0.6	1.56	191	115	0.25	23
Drum Storage (Power Plant)	1,540	NA	0.91	9.81	0.05	4.23	0.6	2.54	311	187	0.25	79
Elevator 348-F-741 (Med School, Loading Dock)	145	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	24
Elevator 348-P-2198 (South Garage)	180	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	27

Depiction on Site Plan	Capacity (gal)	Tank Orientation	Height of Tank (m)	Gravity	Puncture Area (ft^2)	V2 (m/sec)	Discharge Coefficient	V2, Assuming Friction (m/sec)	Flow Rate (gal/min)	Discharge Assuming Friction Coefficient (gal/min)	Zero Flow Rate (inches)	Spill Radius (ft)
Qualifying Containers												
Elevator 348-P-2200 (South Garage)	180	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	27
Elevator 348-P-2199 (South Garage)	180	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	27
Elevator 348-F-743 (Teaching Hospital)	185	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	27
Elevator 348-P-1880 (Benedict Building)	210	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	29
Elevator 348-P-1879 (Benedict Building)	210	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	29
Elevator 348-P-1838 (Power Plant)	200	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	29
Elevator Cemco #1 (Albert Sherman Center)	250	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	32
Elevator Cemco #2 (Albert Sherman Center)	250	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	32
Elevator Passenger (Biotech 1)	210	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	29

Depiction on Site Plan	Capacity (gal)	Tank Orientation	Height of Tank (m)	Gravity	Puncture Area (ft^2)	V2 (m/sec)	Discharge Coefficient	V2, Assuming Friction (m/sec)	Flow Rate (gal/min)	Discharge Assuming Friction Coefficient (gal/min)	Zero Flow Rate (inches)	Spill Radius (ft)
Qualifying Containers												
Elevator Freight (Biotech 1)	210	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	29
Elevator 348-P-1346 (Biotech 2)	185	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	27
Elevator 348-P-1347 (Biotech 2)	210	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	29
Elevator 348-P-1825 ELV 1 (Biotech 3)	185	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	27
Elevator 348-P-1826 ELV 2 (Biotech 3)	185	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	27
Elevator ELV #1 *ADA* (Biotech 4)	150	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	25
Elevator ELV #2 (Biotech 4)	134	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	23
Elevator FRNT PASS (Biotech 5)	250	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	32
Elevator BK SVC (Biotech 5)	250	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	32

Depiction on Site Plan	Capacity (gal)	Tank Orientation	Height of Tank (m)	Gravity	Puncture Area (ft^2)	V2 (m/sec)	Discharge Coefficient	V2, Assuming Friction (m/sec)	Flow Rate (gal/min)	Discharge Assuming Friction Coefficient (gal/min)	Zero Flow Rate (inches)	Spill Radius (ft)
Qualifying Containers												
Front Loader (Loading Dock)	129	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	23
Non-Qualifying Containers												
Compactor (UMass Lazare Research Building)	15	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	8
Compactor (UMass Medical School)	15	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	8
Compactor (UMass Medical School)	20	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	9
Compactor (ACC Building)	15	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	8
Compactor (ACC Building)	15	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	8
Compactor (Bio Tech Five)	20	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	9
Compactor (Bio Tech Five)	20	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	9
Compactor (Bio Tech Four)	20	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	9

Depiction on Site Plan	Capacity (gal)	Tank Orientation	Height of Tank (m)	Gravity	Puncture Area (ft^2)	V2 (m/sec)	Discharge Coefficient	V2, Assuming Friction (m/sec)	Flow Rate (gal/min)	Discharge Assuming Friction Coefficient (gal/min)	Zero Flow Rate (inches)	Spill Radius (ft)
Non-Qualifying Containers												
Compactor (Bio Tech One)	20	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	9
Compactor (Bio Tech Two)	20	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	9
Compactor (Bio Tech Three)	20	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	9
Compactor (BNRI)	20	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	9
Compactor (Receiving)	20	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	9
Compactor (Receiving)	40	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	13
Compactor (Receiving)	20	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	9
Compactor (Sherman Center)	20	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	9
Compactor (Sherman Center)	20	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	9
Compactor (Sherman Center)	20	NA	NA	9.81	0.05	NA	0.6	NA	NA	NA	0.25	9

APPENDIX C

OIL TRANSFER POLICY

NOTICE TO TANK TRUCK DRIVERS

To prevent the release of substances hazardous to the environment, tank truck drivers entering this Facility are to comply with the following rules:

- driver reports to shift supervisor on arrival;
- shift supervisor verifies that UMMS is the customer by reviewing paperwork;
- shift supervisor verifies the sulfur content of the fuel is equal to or less than 0.5 percent for No. 6 oil, or that ultra-low sulfur diesel (ULSD) is provided for No. 2 fuel oil;
- engineer accompanies the driver to fill area;
- engineer and driver ensure that a screen is installed in the fill pipe;
- engineer and driver verify that there are no rags in fill box or fill pipe;
- when receiving No. 6 oil, engineer and driver make sure trailer is warm;
- engineer monitors driver while the fill hose is installed in the fill pipe to ensure that no rags are used, or oil spills occur
- driver notifies shift supervisor when the truck is empty;
- engineer accompanies driver while the fill line is removed, and covers are put back on to ensure that no rags are used, or spills occur; and
- shift supervisor signs paperwork.

In the event of a spill or release of oil, the following procedures must be followed:

- if a spill of less than 10 gallons occurs, regardless of volume, the attendant must immediately place absorbent on the spilled fuel and immediately pick up the absorbed material with a sweeping brush and shovel, place the adsorbed material in a 'Used Absorbent' receptacle, and contact the SPCC Coordinator or secondary SPCC Coordinator; and
- if a spill of 10 gallons or more occurs, immediate steps must be taken to contain the spill, obtain help, and report the incident to the SPCC Coordinator or secondary SPCC Coordinator.

APPENDIX D

SPILL, FIRE, AND SAFETY EQUIPMENT

SPILL, FIRE, AND SAFETY EQUIPMENT

Appendix E of the ICP provides an inventory of emergency spill and response equipment that can be found throughout the Facility.

The following safety equipment should be available to protect employees and provide containment of constituents in the event of an oil spill.

- Spill control/countermeasure materials:
    - Spill Control Kits are located at the Facility. Each kit, at a minimum, includes:
        - one drum;
        - gloves;
        - oil dry, absorbent materials (or equivalent);
        - sorbent socks and pads;
        - shovels;
        - brooms; and
        - drain pans.
- Fire extinguishers:
    - Portable fire extinguishers and a fire alarm pull stations are located throughout the Facility building.

APPENDIX E

PERSONNEL TRAINING RECORD

PERSONNEL TRAINING RECORD
SPILL PREVENTION, CONTROL, AND COUNTERMEASURE PLAN
UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL
WORCESTER, MASSACHUSETTS

Description of Training Topics ____

____

Instructor ______________________________ Date ______________________

EMPLOYEE NAMES

Printed Name	Signature

APPENDIX F

INSPECTION RECORDS AND INCIDENT REPORT FORMS

TANK INSPECTION RECORD
UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL
WORCESTER, MASSACHUSETTS

Provide a description of the corrective actions required for items identified as “No” or “Unsatisfactory” during the monthly inspections

____
____
____
____
____
____
____
____
____
____
____
____

Corrective Action to Be Taken By:________________________________

Correction Action Completion Date:_______________________________

To the best of my knowledge, trained personnel have performed the inspection and completed this inspection report on the date indicated:

____________________________ ______________________
Supervisor Signature Date

____
Printed Name

MONTHLY INSPECTION QUESTIONNAIRE AND CERTIFICATION
UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL
WORCESTER, MASSACHUSETTS

Question No. 1
Has a release, evidence of release, or potential for release of petroleum to the environment from the AST or AST structures occurred?
Circle one: YES / *NO*

If yes, explain: ____

____

Question No. 2
Does/did the AST or AST structures require repair?
Circle one: YES / *NO*

If yes, explain: ____

____

____

Question No. 3
Has petroleum been released that requires clean up and disposal?
Circle one: YES / *NO*
If yes, explain: ____

____

____

Refer to the SPCC Plan for reporting requirements.

To the best of my knowledge, trained personnel have performed the inspection and completed this inspection report on the date indicated:

______________________________ ______________________________
Supervisor Signature Date

____
Printed Name

MONTHLY TANK INSPECTION RECORD
UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL
WORCESTER, MASSACHUSETTS

Directions: This inspection report has been prepared in accordance with the SP001-05, API-653, and USEPA regulation 40 CFR 112.7. This form should be completed on a monthly basis by trained personnel.

Date: ________________ Inspector's Name: __________________________ Inspector's Signature:________________________

Frequency	Inspection Item	Tank 1 9,600 gal.	Tank 2 3,000 gal.	Tank 3 6,000 gal.	Tank 4 84,000 gal.	Tank 5 84,000 gal.	COMMENTS
Monthly	Pipes, valves and other associated equipment for deficiencies	S / U	S / U	S / U	S / U	S / U	
	Malfunctioning equipment	S / U	S / U	S / U	S / U	S / U	
	Stained Soil, Pavement, or Floor	S / U	S / U	S / U	S / U	S / U	
	Piping Support Condition	S / U	S / U	S / U	S / U	S / U	
	High Level Alarm/Whistle Condition	S / U	S / U	S / U	S / U	S / U	
	Label Condition	S / U	S / U	S / U	S / U	S / U	
	Water in Containment	NA	NA	NA	Yes / No	Yes / No	
	Oil Spill Response Supplies Available	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Leak from Tank/Container	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Secondary Containment Condition	S / U	S / U	S / U	S / U	S / U	
	Valves Closed and Locked	S / U	S / U	S / U	S / U	S / U	
	Safety Equipment in Place and Operative	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Noticeable container distortions, buckling, denting or bulging	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Exterior Clean and Intact	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Tank Supports Condition	NA	NA	NA	S / U	S / U	
	Tank Foundation Condition	NA	NA	NA	NA	NA	

NA – Not Applicable **S – Satisfactory** **U – Unsatisfactory**

MONTHLY TANK INSPECTION RECORD
UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL
WORCESTER, MASSACHUSETTS

Directions: This inspection report has been prepared in accordance with the SP001-05, API-653, and USEPA regulation 40 CFR 112.7. This form should be completed on a monthly basis by trained personnel.

Date: ________________ Inspector's Name: ___________________________ Inspector's Signature:_________________________

Frequency	Inspection Item	Tank 6 84,000 gal.	Tank 7 84,000 gal.	Tank 8 84,000 gal.	Tank 9 4,000 gal. diesel/ 2,000 gal.	Tank 10 100 gal.	Tank 11 3,000 gal.	COMMENTS
Monthly	Pipes, valves and other associated equipment for deficiencies	S / U	S / U	S / U	S / U	S / U	S / U	
	Malfunctioning equipment	S / U	S / U	S / U	S / U	S / U	S / U	
	Stained Soil, Pavement, or Floor	S / U	S / U	S / U	S / U	S / U	S / U	
	Piping Support Condition	S / U	S / U	S / U	S / U	S / U	S / U	
	High Level Alarm/Whistle Condition	S / U	S / U	S / U	S / U	S / U	S / U	
	Label Condition	S / U	S / U	S / U	S / U	S / U	S / U	
	Water in Containment	Yes / No	Yes / No	Yes / No	NA	NA	Yes / No / NA	
	Oil Spill Response Supplies Available	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Leak from Tank/Container	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Secondary Containment Condition	S / U	S / U	S / U	S / U	S / U	S / U	
	Valves Closed and Locked	S / U	S / U	S / U	S / U	S / U	S / U	
	Safety Equipment in Place and Operative	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Noticeable container distortions, buckling, denting or bulging	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Exterior Clean and Intact	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Tank Supports Condition	S / U	S / U	S / U	NA	NA	NA	
	Tank Foundation Condition	NA	NA	NA	NA	NA	NA	

NA – Not Applicable **S – Satisfactory** **U – Unsatisfactory**

ANNUAL TANK INSPECTION RECORD
UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL
WORCESTER, MASSACHUSETTS

Directions: This inspection report has been prepared in accordance with the SP001-05, API-653, and USEPA regulation 40 CFR 112.7. This form should be completed on an annual basis by trained personnel.

Date: ________________ Inspector's Name: ___________________________ Inspector's Signature:_________________________

Frequency	Inspection Item	Tank 1 9,600 gal.	Tank 2 3,000 gal.	Tank 3 6,000 gal.	Tank 4 84,000 gal.	Tank 5 84,000 gal.	COMMENTS
Annually	Containment structure has no holes or cracks, washout, liner degradation, corrosion, leakage, paint failure, tank settling	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Foundation has no settlement or foundation washout	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Concrete pad is not cracking or spalling	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Supports are free of corrosion, paint failure, etc.	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Water drains away from tank	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Tank grounding is secure and in good condition	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Cathodic protection is functioning	NA	NA	NA	NA	NA	
	Record hour meter, ammeter, and voltmeter readings	NA	NA	NA	NA	NA	
	Tank coating does not show signs of failure	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Tank does not show signs of dents, buckling, bulging, corrosion, cracking, etc.	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Roof is free of low points and signs of standing water	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Vent components are moving freely, and passageways are not obstructed	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Valves are in good condition and operating properly (anti-siphon valve, pressure regulator valve, expansion relief valve, solenoid valves, fire and sheer valves)	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Interstitial leak detection equipment is in good condition and free of corrosion	Yes / No / NA	Yes / No / NA	Yes / No / NA	Yes / No / NA	Yes / No / NA	

ANNUAL TANK INSPECTION RECORD
UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL
WORCESTER, MASSACHUSETTS

Frequency	Inspection Item	Tank 1 9,600 gal.	Tank 2 3,000 gal.	Tank 3 6,000 gal.	Tank 4 84,000 gal.	Tank 5 84,000 gal.	COMMENTS
Annually	Spill containment boxes on fill pipe are free of corrosion and are checked for tightness	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Strainers are clean and in good condition	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Filters are in good condition, are within the manufacturer's service life, and are free of leaks or decreased fuel flow	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Flame arrestors are free of corrosion and blockage of air passages	NA	NA	NA	NA	NA	
	Leak detectors for submersible pump systems are checked according to manufacturer's requirements	Yes / No / NA	Yes / No / NA	Yes / No / NA	Yes / No / NA	Yes / No / NA	
	Liquid level equipment is operating properly	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Overfill equipment is operating properly	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Insulation is not missing or showing signs of moisture, mold, or damage	Yes / No / NA	Yes / No / NA	Yes / No / NA	Yes / No / NA	Yes / No / NA	
	Insulation covers, or jackets do not show signs of damage that will allow water intrusion	Yes / No / NA	Yes / No / NA	Yes / No / NA	Yes / No / NA	Yes / No / NA	
	Electrical wiring boxes are in good condition	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Labels and tags are intact and readable	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	

Describe any observations/corrections for items checked 'NO'.

Note that the attached Massachusetts Department of Fire Services form must be completed by a State-certified Professional Engineer for Tanks 4, 5, 6,7, and 8.

ANNUAL TANK INSPECTION RECORD
UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL
WORCESTER, MASSACHUSETTS

Directions: This inspection report has been prepared in accordance with the SP001-05, API-653, and USEPA regulation 40 CFR 112.7. This form should be completed on an annual basis by trained personnel.

Date: ________________ Inspector's Name: ___________________________ Inspector's Signature:_________________________

Frequency	Inspection Item	Tank 6 84,000 gal.	Tank 7 84,000 gal.	Tank 8 84,000 gal.	Tank 9 4,000 gal. diesel/ 2,000 gal.	Tank 10 100 gal.	Tank 11 3,000 gal.	COMMENTS
Annually	Containment structure has no holes or cracks, washout, liner degradation, corrosion, leakage, paint failure, tank settling	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Foundation has no settlement or foundation washout	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Concrete pad is not cracking or spalling	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Supports are free of corrosion, paint failure, etc.	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Water drains away from tank	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Tank grounding is secure and in good condition	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Cathodic protection is functioning	NA	NA	NA	NA	NA	NA	
	Record hour meter, ammeter, and voltmeter readings	NA	NA	NA	NA	NA	NA	
	Tank coating does not show signs of failure	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Tank does not show signs of dents, buckling, bulging, corrosion, cracking, etc.	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Roof is free of low points and signs of standing water	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Vent components are moving freely, and passageways are not obstructed	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Valves are in good condition and operating properly (anti-siphon valve, pressure regulator valve, expansion relief valve, solenoid valves, fire and sheer valves)	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Interstitial leak detection equipment is in good condition and free of corrosion	Yes / No / NA	Yes / No / NA	Yes / No / NA	Yes / No / NA	Yes / No / NA	Yes / No / NA	

ANNUAL TANK INSPECTION RECORD
UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL
WORCESTER, MASSACHUSETTS

Frequency	Inspection Item	Tank 6 84,000 gal.	Tank 7 84,000 gal.	Tank 8 84,000 gal.	Tank 9 4,000 gal. diesel/ 2,000 gal.	Tank 10 100 gal.	Tank 11 3,000 gal.	COMMENTS
Annually	Spill containment boxes on fill pipe are free of corrosion and are checked for tightness	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Strainers are clean and in good condition	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Filters are in good condition, are within the manufacturer's service life, and are free of leaks or decreased fuel flow	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Flame arrestors are free of corrosion and blockage of air passages	NA	NA	NA	NA	NA	NA	
	Leak detectors for submersible pump systems are checked according to manufacturer's requirements	Yes / No / NA	Yes / No / NA	Yes / No / NA	Yes / No / NA	Yes / No / NA	Yes / No / NA	
	Liquid level equipment is operating properly	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Overfill equipment is operating properly	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Insulation is not missing or showing signs of moisture, mold, or damage	Yes / No / NA	Yes / No / NA	Yes / No / NA	Yes / No / NA	Yes / No / NA	Yes / No / NA	
	Insulation covers, or jackets do not show signs of damage that will allow water intrusion	Yes / No / NA	Yes / No / NA	Yes / No / NA	Yes / No / NA	Yes / No / NA	Yes / No / NA	
	Electrical wiring boxes are in good condition	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	
	Labels and tags are intact and readable	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	Yes / No	

Describe any observations/corrections for items checked 'NO'.

____
____
____
____
____
____

Note that the attached Massachusetts Department of Fire Services form must be completed by a State-certified Professional Engineer for Tanks 4, 5, 6,7, and 8.

The Commonwealth of Massachusetts

DEPARTMENT OF FIRE SERVICES

AST Use Permit Renewal Annual Inspection Form

for an aboveground storage tank, in excess of 10,000-gallon gross capacity, for the storage of fluids other than water.

FP-102
(Rev. 02/13)

Pursuant to Massachusetts General Laws (M.G.L.) c. 148, § 37, all aboveground storage tanks, subject to the requirements of 502 C.M.R. 5.00, shall be inspected annually. All information must be typed or neatly printed. **All fields must be completed or the Annual Inspection Form will be returned**. A separate **Annual Inspection Form** shall be submitted for each individual tank. For tank construction or installation, use the **Application for Construction and Installation**. For tank maintenance, as defined in 502 CMR 5.00, use the **Application for Maintenance.**

Business/Site Information:

Business name:____

Street address: ____

Business (mailing) address: __________________________________

Address (or location) of tank: ________________________________

Person principally in charge of the tank: ____________________ Title: ____________________

Telephone number: ____________________ Fax Number: ____________________

Contact name's e-mail address: ________________________________

Corporate Information: ☐ Same information as in Business/Site above

Business name:____

Business (mailing) address: __________________________________

Contact name: ______________________________ Title: ____________________

Telephone number: ____________________ Fax Number: ____________________

Contact name's e-mail address: ________________________________

Tank Information:

Office of the Massachusetts State Fire Marshal number: **OSFM #** ____________________ ☐ None

The tank is: ☐ In-Service ☐ Out-of-Service (if tank is cleaned of product, see form FP-112)

Gross capacity (aggregate if compartmented) ________________ ☐ Gallons ☐ Barrels ☐ Cubic Feet

Operator's Tank Identification: ________________________________

Tank description: ______________________________________

Compartmented tank? ☐ No ☐ Yes – you must fill out form FP-104 Compartmented Tanks.

Secondary Containment Type: ☐ Dike ☐ Doublewall ☐ Vault ☐ None ☐ Other:

Content Information:

Content Category (only from the approved list): ____________________________

Content Description (only from the approved list): __________________________

527 CMR Class: ☐ I ☐ II ☐ IIIA ☐ IIIB ☐ Non-Combustible Liquid ☐ Flammable Gas ☐ Non-Flammable Gas

Fire Department Presence:

Was the local fire department present for the inspection? ☐ No ☐ Yes: Name: ____________________

Any fire department comments must be put on a separate page. Separate page(s) included? ☐ Yes, number of pages included: ____ ☐ No

Date of Inspection:____________________

Inspector Information:

Inspector's name: ___

Business name: ___

Address: ___

Telephone number: ___ Fax Number: ___

Inspector's e-mail address: ___

Check one:

- ☐ API 653 Inspector. Number: ___ Exp: ___
- ☐ ASME Pressure Vessel Inspector. Number: ___ Exp: ___
- ☐ Mass. P.E. Number: ___ Discipline: ___ Exp: ___
- ☐ SP001 AST Certified Tank Inspector. Number: ___ Exp: ___
- ☐ FTPI 2007-1 Inspector. Number: ___ Exp: ___
- ☐ Other Inspector. All "Others Inspectors" must be previously approved in writing by the Office of the State Fire Marshal, AST Program.

All Inspectors are only allowed to inspect aboveground storage tanks within their license's scope of practice.

Is there a valid registration for this product? ☐ Yes ☐ No ☐ Not required

Are there valid fire department permits for this product?

☐ Yes, expiration date: __ ☐ No ☐ Not required

Has this tank been inspected in the nature and frequency as prescribed in 502 CMR 5.05(1)? ☐ Yes ☐ No

Does this tank have an accurate written record as prescribed in 502 CMR 5.05(2)? ☐ Yes ☐ No

Has the person principally in charge of the tank signed each inspection record, per 502 CMR 5.05(2)? ☐ Yes ☐ No

Have any permits for maintenance (502 CMR 5.04(1)) been issued since the last Annual Inspection Form was submitted?

☐ Yes ☐ No If "Yes", the date the permit was issued by the Office of the State Fire Marshal: ___

Have any permits for emergency repair (502 CMR 5.04(3)(e)) been issued since the last Annual Inspection Form was submitted? ☐ Yes ☐ No If "Yes", the date the permit was issued by the Office of the State Fire Marshal: ___

Sign only one of the following:

A. By signing below, I certify that I inspected this AST (its installation, its related ancillary equipment, and secondary containment) in accordance with 502 CMR 5.00. During my inspection, **I found at least one unsatisfactory condition with the AST and/or its related ancillary equipment, or secondary containment/dike, that is unsafe to life, property and/or the environment. The use of the AST must be discontinued immediately.**

Inspector's signature: ___ Date: ___

B. By signing below, I certify that I inspected this AST (its installation, its related ancillary equipment, and secondary containment) in accordance with 502 CMR 5.00. During my inspection, **I found at least one unsatisfactory condition. I have attached to this form a letter from the person principally in charge of the tank acknowledging the unsatisfactory condition(s) and giving a timeline when each issue will be remedied. To the best of my knowledge, the tank, its installation, its related ancillary equipment and secondary containment or dikes, are: in working condition; do not pose a significant safety risk to life, property, and/or the environment; and, except as identified, are compliant with the applicable regulations and standards.**

Inspector's signature: ___ Date: ___

C. By signing below, I certify that I inspected this AST (its installation, its related ancillary equipment, and secondary containment) in accordance with 502 CMR 5.00. During my inspection, **I found at least one unsatisfactory issue that needed to be remedied (list attached). I have confirmed that each unsatisfactory issue has been remedied, and now, to the best of my knowledge, the tank, its installation, its related ancillary equipment and secondary containment or dikes, are all in good working condition and are compliant with the applicable regulations and standards.**

Inspector's signature: ___ Date: ___

D. By signing below, I certify that I inspected this AST (its installation, its related ancillary equipment, and secondary containment) in accordance with 502 CMR 5.00. **To the best of my knowledge, the tank, its installation, its related ancillary equipment and secondary containment or dikes, are all in good working condition and are compliant with the applicable regulations and standards.**

Inspector's signature: ___ Date: ___

E. By signing below, I certify that I have inspected this AST (its installation, its related ancillary equipment, and secondary containment) in accordance with 502 CMR 5.00. The tank is: no longer in service; has been altered so that it no longer contains product; fill connections are removed or capped; is marked "OUT OF SERVICE – DO NOT FILL"; **and, to the best of my knowledge the out of service tank, its installation, its related ancillary equipment and secondary containment or dikes, is in a condition such that they do not pose a safety concern to life, property or environment.**

Inspector's signature: ___ Date: ___

MONTHLY CONTAINER INSPECTION RECORD
UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL
WORCESTER, MASSACHUSETTS

Directions: This form should be completed for each container at the Facility on a monthly basis by trained personnel.

Date: __________ Inspector's Name: __________________ Inspector's Signature:____________

Egress pathways clear and gates/doors operable

Oil Spill Response Supplies Available

1. Total number of containers in area? ____________

		Yes	No
2.	Are the containers located within the designated storage area?	☐	☐
3.	Are containers stored on a secondary containment pallet?	☐	☐
4.	Is the containment free of water and other materials?	☐	☐
5.	Are valves operable and in a closed position?	☐	☐
6.	Is the area around the container storage area free from signs of leakage?	☐	☐
7.	Is the container free of noticeable signs of buckling, distortion, denting, or bulging?	☐	☐
8.	Are egress pathways clear and are gates/doors operable?	☐	☐
9.	Are oil spill response supplies available nearby?	☐	☐

Describe any observations/corrections for items checked 'NO'.

____
____
____
____
____
____
____
____

MONTHLY TRANSFORMER INSPECTION RECORD
UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL
WORCESTER, MASSACHUSETTS

Directions: This form should be completed for each container at the Facility on a monthly basis by trained personnel.

Date: __________ Inspector's Name: ___________________ Inspector's Signature:_____________

Equipment	Inspection Completed (✓)	Comments/Corrective Actions
Outdoor Transformer 1		
Outdoor Transformer 2		
Transformer TSI-001		
Transformer TSI-002		
Transformer TSI-005		
Transformer TSI-006		
Transformer TSI-007		
Transformer TSI-008		
Transformer TSI-009		
Transformer TSI-010		
Transformer TSI-011		
Transformer TSI-012		
Transformer TSI-013		
Transformer TSI-014		
Transformer TSI-015		
Transformer TSI-016		
Transformer TSI-017		
Transformer TSI-018		
Transformer TSI-019		
Transformer 1 at Ambulatory Care Center		
Transformer 2 at Ambulatory Care Center		

Inspections should include a review of the following:

- The floor beneath the (indoor) transformer is impervious and free of cracks and openings.
- There is no liquid (oil, water, etc.) or staining under/around the transformer.
- Containment berms are not damaged.
- The equipment is not leaking.
- Equipment is clean and not visibly damaged.
- Spill response supplies are available nearby.
- Safety equipment is available nearby.

MONTHLY OIL-FILLED OPERATIONAL EQUIPMENT INSPECTION RECORD
UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL
WORCESTER, MASSACHUSETTS

Directions: This form should be completed for each container at the Facility on a monthly basis by trained personnel.

Date: __________ Inspector's Name: ___________________ Inspector's Signature: _____________

Equipment	Inspection Completed (✓)	Comments/Corrective Actions
Generator at Biotech 4		
Helicopter		
Generator G1		
Generator G2		
Generators G1 and G2 Hydraulic Skid		
Generator G3		
Chiller 4 Murray Turbine		
Chiller 5 York Compressor		
Solar CTG		
Enerflex Gas Compressor		
Front Loader (Loading Dock)		

Inspections should include a review of the following:

- the floor beneath the equipment is impervious and free of cracks and openings;
- there is no liquid (oil, water, etc.) or staining under/around the equipment;
- the equipment is not leaking;
- equipment is clean and not visibly damaged;
- spill response supplies are available nearby; and
- safety equipment is available nearby.

MONTHLY ELEVATOR OPERATIONAL EQUIPMENT INSPECTION RECORD
UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL
WORCESTER, MASSACHUSETTS

Directions: This form should be completed for each container at the Facility on a monthly basis by trained personnel.

Date: __________ Inspector's Name: ___________________ Inspector's Signature:_____________

Elevator	Inspection Completed (✓)	Comments/Corrective Actions
Elevator 348-F-741 (Med School, Loading Dock)		
Elevator 348-P-2198 (South Garage)		
Elevator 348-P-2200 (South Garage)		
Elevator 348-P-2199 (South Garage)		
Elevator 348-F-743 (Teaching Hospital)		
Elevator 348-P-1880 (Benedict Building)		
Elevator 348-P-1879 (Benedict Building)		
Elevator 348-P-1838 (Power Plant)		
Elevator Cemco #1 (Albert Sherman Center)		
Elevator Cemco #2 (Albert Sherman Center)		
Elevator Passenger (Biotech 1)		
Elevator Freight (Biotech 1)		
Elevator 348-P-1346 (Biotech 2)		
Elevator 348-P-1347 (Biotech 2)		
Elevator 348-P-1825 ELV 1 (Biotech 3)		
Elevator 348-P-1826 ELV 2 (Biotech 3)		
Elevator ELV #1 *ADA* (Biotech 4)		
Elevator ELV #2 (Biotech 4)		
Elevator FRNT PASS (Biotech 5)		
Elevator BK SVC (Biotech 5)		

Inspections should include a review of the following:

- there is no liquid (oil, water, etc.) or staining in the elevator shaft;
- the elevator's hydraulic system is not leaking;
- the elevator is clean and not visibly damaged;
- spill response supplies are available nearby; and
- safety equipment is available nearby.

HAZARDOUS WASTE STORAGE
CENTRAL ACCUMULATION AREA
WEEKLY INSPECTION CHECKLIST

Total Number of Containers:____________ Estimated Volume of Waste: ______________
Check (✓) if no problems noted.

Inspection of Waste Storage Area		✓	**Comments/Corrective Actions**
	STORAGE AREA		
1.	Is hazardous waste storage area demarcated?		
2.	Is hazardous waste storage area free of debris?		
3.	Is hazardous waste area clean and dry?		
4.	Is the floor impervious to liquids?		
5.	Are there “Hazardous Waste” signs posted in the storage area? Are letters at least one inch high?		
	BULKING DRUMS		
6.	Are all drums labeled?		
7.	Are hazardous waste labels in place?		
8.	Are waste names properly spelled out, no abbreviations?		
9.	Are contents properly presented?		
10.	Are hazards properly presented?		
11.	Is there an accumulation start date?		
12.	Are all bungs tightened down? Signs of liquid around bungs?		
13.	Is there free space around the drums? Can all labels be read?		
14.	Have all unnecessary signs, labels, stickers be removed from the drums?		
15.	Condition of drums? a. Any visible leaks? Around bung cap? b. Any bulges or creases available?		
16.	Are grounding cables securely attached to drums?		
17.	Is secondary containment provided?		
	LAB PACK		
18.	Are all labels visible on the containers?		
19.	Are there any leaks visible?		
20.	Are all necessary signs in place?		
21.	No dual labeling on any waste container.		
22.	Do all waste containers have a proper full date on them?		
	SAFETY ISSUES		
23.	Is there a fire extinguisher present? a. Is the fire extinguisher securely mounted to the wall?		
24.	Is proper spill equipment in place?		
25.	Are emergency contact numbers posted?		
26.	Are there any visible leaks or spills around/on any of the containers?		
27.	Are there any other concerns?		
28.	Are EXITS from rooms clear on both sides of the doors?		

EH&S 63985
Rev 10/2018

NOTIFY SUPERVISOR IMMEDIATELY IF ANYTHING UNUSUAL FOUND OR ANY UNUSUAL CONDITIONS FOUND IN THE WASTE ROOMS.

Signed: ______________________________ Date and Time: _______________

Inspector’s Name:______________________

INCIDENT REPORT FORM

1. TIME AND DATE RELEASE DISCOVERED? ______________________________

2. TIME AND DATE RELEASE STOPPED? _________________________________

3. APPROXIMATE LOCATION AND TYPE OF ACCIDENT (E.G., FIRE, EXPLOSION, SPILL)?

   ____

   ____

4. MATERIAL RELEASED?____
   APPROXIMATE AMOUNT (gallons)? ____________________________________

5. EXTENT OF INJURIES (IF ANY)? ____________________________________

   ____

6. WHAT DAMAGE TO PEOPLE OR THE ENVIRONMENT IS LIKELY?

   ____

7. ESTIMATED AMOUNT OF MATERIAL RECOVERED?

   ____

8. WHAT WAS DONE WITH RECOVERED MATERIAL?

   ____

9. ACTION TAKEN TO CONTROL THE PROBLEM AND PREVENT FURTHER PROBLEMS?

   ____

   ____

   ____

10. NOTIFICATIONS TO EXTERNAL AGENCIES? YES: ____ NO: _____

11. TIME NOTIFICATIONS MADE?

AGENCY: ____ TIME: ______________
AGENCY: ____ TIME: ______________
AGENCY: ____ TIME: ______________
SIGNATURE (MANAGER) ___________________________ DATE: ______________

APPENDIX G

EMERGENCY CONTACTS AND SPILL RESPONSE PROCEDURE

OIL SPILL NOTIFICATION FLOW CHART
UNIVERSITY OF MASSACHUSETTS MEDICAL SCHOOL
WORCESTER, MASSACHUSETTS

The following summarizes the response procedures to be implemented in the event of an oil release. For additional response procedures refer to the Integrated Contingency Plan.

INTERNAL NOTIFICATION AND RESPONSE

If a spill is discovered, the individual discovering the spill will immediately take action to stop the spill and then notify the SPCC Coordinator.

SPCC Coordinator/ Primary Emergency Contact:	Secondary SPCC Coordinator:	SPCC Coordinators (Power Plant Only):
Jo-Ann Ranslow Office Phone: (508) 856-6723 Cell Phone: (508) 735-6263 Pager: (508)722-0020	**Matt Bosselait** Office Phone: (508) 856-8461 Cell Phone: (978) 875-2269	**Joe Collins** Office Phone: (508) 856-2220 Pager: (508) 722-3359 **Bruce Hjort** Office Phone: (508) 856-2153 Cell Phone: (774) 312-1727

After receiving notification of the spill the SPCC Coordinator will be responsible for actions and will supervise efforts to provide containment of the spill to prevent to exacerbation of the spill. Clean-up crews, under the direction of the SPCC Coordinator, should isolate or repair the source of the leak/spill to prevent additional spillage. Clean-up crews will utilize spill clean-up materials provided and employ Safe Work Practices.

The SPCC Coordinator will evaluate the need and if required will contact additional assistance (i.e., outside clean-up contractors). The contact information for outside clean-up contractors is listed below:

Clean Harbors
(800) 645-8265

New England Disposal Tech
(800) 698-1865

FEDERAL AND STATE NOTIFICATION

WATER: The SPCC Coordinator will notify the National Response Center and the Massachusetts Department of Environmental Protection (MassDEP) at the telephone numbers provided below, if the spill results in a discharge of quantity of oil into surface waters or wetlands. If the spill results in the release of more than 1,000 gallons of oil into or upon a river, or if it is the second spill event of oil (>42 gallons) into such river within a twelve-month period, the SPCC Coordinator will notify the USEPA.

LAND: The SPCC Coordinator will notify the MassDEP if the spill results in the release or threat or release of 10 gallons or more of oil (or 55 gallons of cooking oil) on the land or surface or subsurface strata of the State of Massachusetts, off site drainage structures, or sewer lines.

MassDEP Spill Hotline – (888) 304-1133
USEPA – (888) 372-7341
National Response Center – (800) 424-8802

The SPCC Coordinator will prepare an Incident Report Form upon completion of spill clean-up and ensure the required notification forms and reports are submitted to the appropriate regulatory agencies.

LOCAL NOTIFICATION

The following local agencies will be called to provide assistance at the facility as needed:

Worcester Fire Department	Worcester Police Department	UMPD	Worcester Health Department	UMMS Medical Center	Upper Blackstone Water Pollution Abatement District	Ambulance
141 Grove Street Worcester, MA Phone: (508) 799-1821 Emergency Number: 911	9-11 Lincoln Square Worcester, MA Phone: (508) 799-8606 Emergency Number: 911	Phone: 9-911	25 Meade Street Worcester, MA Phone: (508) 799-8531	55 Lake Avenue, North Worcester, MA Phone: (508) 334-1000	Phone: (508) 755-1286	911

1. **Recover or Clean-up Spills <10 Gallons**. As much material as possible should be recovered and reused where appropriate. Liquids absorbed by solid materials shall be shoveled into open-top container, mobilize spill clean-up crew; locate the source of spill and immediately stop discharge, if possible; block off the area to prevent traffic flow from entering the spill area; notify people in the immediate area. Protect nearby catch basins and/or condensation drains with sorbent booms; deploy spill clean-up materials (e.g., sorbent boom, sorbent pads, granular adsorbent material, etc.) as appropriate.

2. **Recover or Clean-up Spills ≥10 Gallons (or ≥55 gallons of cooking oil)** mobilize the spill clean-up crew and notify the SPCC Coordinator; locate the source of spill and immediately stop the discharge, if possible; if there is a potential for fire, call the fire department immediately; notify and mobilize spill clean-up contractor (current spill contractors are **Clean Harbors** and **New England Disposal Tech**); block off the area to prevent traffic flow from entering the spill area; deploy spill clean-up materials (e.g., sorbent boom, sorbent pads, granular adsorbent material, etc.) as appropriate. Try to contain the spill until the spill contractor arrives. Initiate the following actions for spills expected to flow towards catch basin. 1) Protect the catch basins with booms, sandbags or earthen dikes, 2) Use a shovel to create a dike and control the flow of the spill, and 3) Fuel entering catch basins must be removed by the spill clean-up contractor as soon as possible.

3. **Prepare an Internal Report.** After the spill has been controlled and/or cleaned, the SPCC Coordinator will complete the Incident Report Form recording the details of the incident. If the spill is equal to or in excess of a reportable quantity, a copy of the spill record form should be submitted to the USEPA.

4. **Evaluate the SPCC Plan** and amend if necessary. Determine the cause of the incident and evaluate the spill response procedures. Correct any deficiencies and amend the SPCC Plan accordingly. Update Oil Spill History (page iii), to describe the event after each significant spill incident.

This spill response procedure will be posted in the critical areas of the Facility, near the spill response equipment to aid in a quick, effective response. Personnel working in the areas will be notified as to where the procedures are posted.

APPENDIX H

UNDERGROUND STORAGE TANKS

May 13, 2016

Ms. Jo-Ann Ranslow
Chemical and Laboratory Safety Manager
UMass Medical School
55 Lake Ave North
Worcester, MA 01655

Re: Holding Tank Review
55 Lake Ave North, Worcester, MA

Dear Ms. Ranslow,

A trench drain system servicing waste and flammable storage bunkers is present at the noted facility. The trench drains lead to two holding tanks in the parking area. Recent discovery of the system raised questions on regulatory compliance, maintenance, service or repairs, and reporting requirements. As such, Triumvirate Environmental, Inc. (Triumvirate) personnel performed a review of the design, functionality, and overall condition of the drain system. Triumvirate also performed a compliance review to determine what regulatory framework surrounds the drain system, if any, and a system component cleanout and inspection. In conjunction with the assessment, the future use, changes, and/or abandonment of the drainage system were considered. The results and conclusions of the assessment and review are as follows.

Regulatory Review

Regulatory review finds that since the trench drain system and storage sumps service a RCRA hazardous waste main accumulation area, they are a secondary containment for spill protection.

Review of the Title 40: Protection of Environment, Part 264 – Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (40 CFR 264) was conducted to determine the regulatory requirements for the operation of the spill containment structures of the bunkers. Subpart I – Use and Management of Containers, 175 - Containment[1] indicates the requirements of containment. Included are the following:

- Surfaces are free of cracks, gaps and impervious to leaks, spills and accumulations of precipitation;
- Surfaces are sloped to drain leaks, spills and precipitation away from containers;
- The spill storage capacity is 10 percent more than the maximum total container capacity;
- The system is designed to prevent run-on (accumulation of precipitation); and
- Spills accumulated in the containment are removed quickly.

Review of 310 CMR 30.00 – Hazardous Waste, was conducted. Per 310 CMR 30.961(b) storage containers associated with secondary containment are exempt from release detection. Per 310 CMR 30.687: Containment[2], the above RCRA requirements are restated.

[1] http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=1655c3545bb2b35f11db4dc56386c4d6&mc=true&n=sp40.26.264.i&r=SUBPART&ty=HTML#se40.26.264_1175
[2] http://www.mass.gov/eea/docs/dep/service/regulations/310cmr30.pdf

If the system is to remain, according to 310 CMR 30.696, the owner and operator shall inspect the tank system routinely, and as part of the contingency plan required by 310 CMR 30.520 through 30.524, the owner or operator shall specify the procedures to use to respond to tank spills or leaks and timing for expeditious removal of leaked or spilled waste and for repair of the tank. Response to leaks or spills must be completed in accordance with 310 CMR 30.367, which states that if material is released to a tank system utilized as secondary containment system, the owner or operator shall remove all released materials within 24 hours or in as timely a manner as possible to prevent a threat to public health, safety, welfare, or the environment.

If the system is to be modified and the tanks removed from service, the design criteria needs to be confirmed and, pursuant to 310 CMR 30.697 (5) Provision of Secondary Containment, Repair, or Closure, the owner or operator shall close the tank system in compliance with 310 CMR 30.699, which states the at closure of a tank system, the owner or operator shall remove or decontaminate all waste residues, contaminated in the containment system components, any soils, and structures and equipment contaminated with waste; and manage them as hazardous waste. The owner or operator shall be in compliance with all requirements for a closure plan closure activities, cost estimates for closure, and financial responsibility for tank systems as set forth in 310 CMR 30.580, 30.590, and 30.900. Additionally, according to CMR 310 30.693, owners or operators of the new tank systems or components shall obtain and submit to the Department, a written reviewed, certified by a professional engineer, attesting that the secondary containment system has sufficient structural integrity and is accessible for the storing and treating of hazardous waste.

If the entire unit is to be closed, per 310 CMR 30.580, closure for hazardous waste facilities, the owner or operator shall close a hazardous waste facility or hazardous waste unit in a manner that will eliminate the potential for post closure escape of hazardous waste to the extent necessary to assure compliance and prevent any threat to public health, safety, or welfare or the environment. The details would be provided in a Closure Plan.

Holding Tank System Cleaning and Inspection
On February 2, 2016, Triumvirate personnel mobilized to the Site to perform cleaning and assessment activities. Upon arrival, observations were made of the drains, tanks, and tank contents. During the assessment, it was noted that the drains were clogged with sand, silt, vermiculite, and small rocks preventing any inspection with a drain camera. It was also noted that the tank contents totaled approximately 200 gallons of liquid with a large amount of sediment. At that time, it was determined that the drains needed to be cleared of sediment and a vacuum truck would be needed to remove the tank contents. To facilitate waste management, a composite sample of each tanks contents was collected and submitted to Alpha Analytical Laboratories, Inc., for hazardous waste characterization.

The laboratory analytical report is enclosed. Low concentrations of acetone at 89 micrograms per liter (µg/l), 2-Butanone at 13 µg/l, and cadmium at 0.17 milligrams per liter (mg/l) were reported with all other constituents below the method detection limits. None of the concentrations detected exceeded hazardous waste characteristics, making the contents non-RCRA, non-DOT material. The detection of acetone may be attributed to laboratory quality control issues, as the laboratory uses acetone to clean equipment and surfaces. This often leads to low level detection in samples. The detection of 2-Butanone may be attributed to its use as a solvent, and the tanks proximity to the maintenance bays. It is possible a small amount of solvent entered the tank through storm water run-off. The detection of cadmium may be attributed to the metals use as a corrosion resistant plating on steel products, which may have been used on the systems components, given the age of the system and date of installation.

On April 29, 2016, Triumvirate returned to site with a Cusco Vacuum Truck and line jetting equipment, along with a drain camera capable of recording drain inspections. The drains were cleared using the jetting equipment and vacuum truck. Following the cleaning, the camera was inserted into the drain system and the inspections recorded. Recordings can be viewed following this hyperlink. The inspections revealed that the drains are in good condition with no observation of cracks or breaks. Water that was used to clean the drains flowed freely to the tanks. It was noted that each drain pipe had an elbow with an opening downward at the bottom sealed with a plug. This is likely present by design, and does not appear to affect the functionality of the drains.

Following drain cleaning, the tanks were pumped out using the vacuum truck. All liquid was removed. Some sediment and pieces of mortar were left in the tank, as they were too large to remove. Once the tanks were emptied, Triumvirate personnel entered the tank using the appropriate confined space entry permit and procedure and inspected each. Small cracks, spalling of mortar joints, some pitting, and pealing epoxy paint was observed and no evidence of a high level water mark in the east tank. A shallow, approximately ¼ inch crack was observed in the west tank, approximately ½ way from the top of the tank, with heavy pitting above. The crack did not appear to penetrate the concrete tank, and a high level water mark was noted approximately five (5) inches above the tank bottom. Some pitting was also noted. Photographs of the tanks are enclosed.

Based upon the observations made during the assessment, Triumvirate finds that it does not appear that any release to the environment has occurred from the tanks and no historical data has indicated there has been any spills in the waste storage unit where the tanks received flow of hazardous material. Triumvirate recommends closing the existing system and implementing new secondary containment system. Based on the use of the bunkers, age and overall condition of the tanks, they may not be competent to reliably serve as secondary containment for the storage bunker if a spill were to occur in the future. Additionally, the tanks and piping may be reaching their limit of their intended design service life. An initial conversation may be considered with the Massachusetts Department of Environmental Protection (MassDEP) in order to ensure compliance with state regulations for closure and implementation of a modified system.

The information provided in this letter is based upon personal interviews, observations, review of available documents and records and analysis of representative samples. This letter is subject to the limitations of historical documentation, the availability and accuracy of pertinent records, recollections of people interviewed, specific areas of investigation and screening activities performed. This letter is based on the conditions existing at the site on the dates of visits, assessment activities and presented screening results. Site conditions are subject to variations and changes over time and activities and uses of the site subsequent to the dates of work. This assessment did not assess for the presence of chemicals, compounds or hazardous constituents not specifically identified herein, potentially hazardous materials intrinsic to building products or not otherwise specified (e.g., asbestos in fume hood panels or acoustic ceiling tiles, polychlorinated biphenyls in caulking, radon, or lead containing paint). No other warranty is expressed or implied.

If you have any questions or comments please contact the undersigned at (800) 966-9282. Thank you.

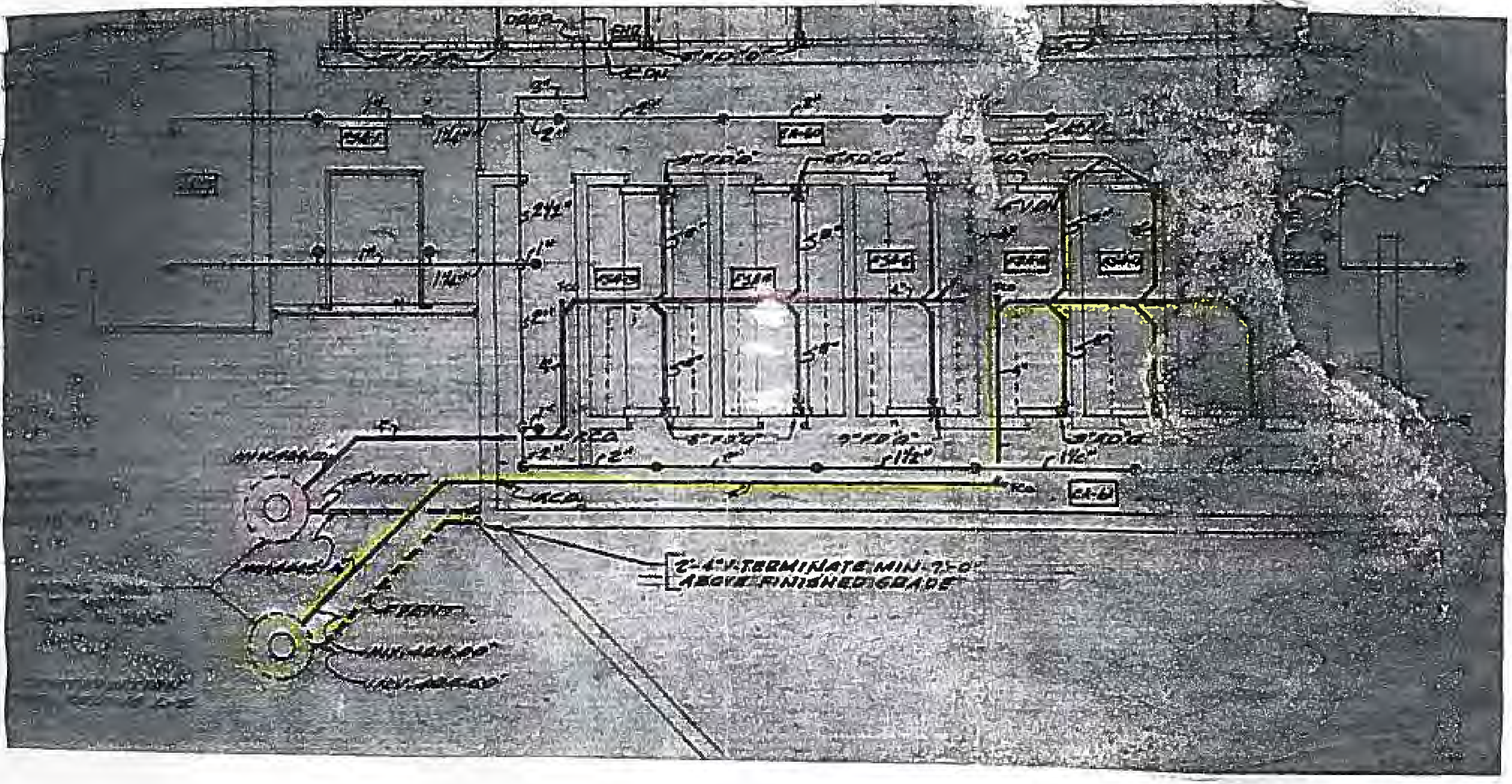
Sincerely,
TRIUMVIRATE ENVIRONMENTAL, INC.

Ryan Miller, EIT
Environmental Engineer

Craig Sasse, LSP
Technical Manager

Enclosures (3)
- Figure
- Site Photographs
- Laboratory Analytical Report

Drain System FSA Storage Rooms From School [illegible] Drawing Sheet P38



Drains are connected to Holding tanks in the parking area.

Site Photographs

East Tank Before Cleaning

Trench Drain Before Cleaning

West Tank Before Cleaning

Trench Drain Before Cleaning

Site Photographs


Confined Space Entry Set-Up

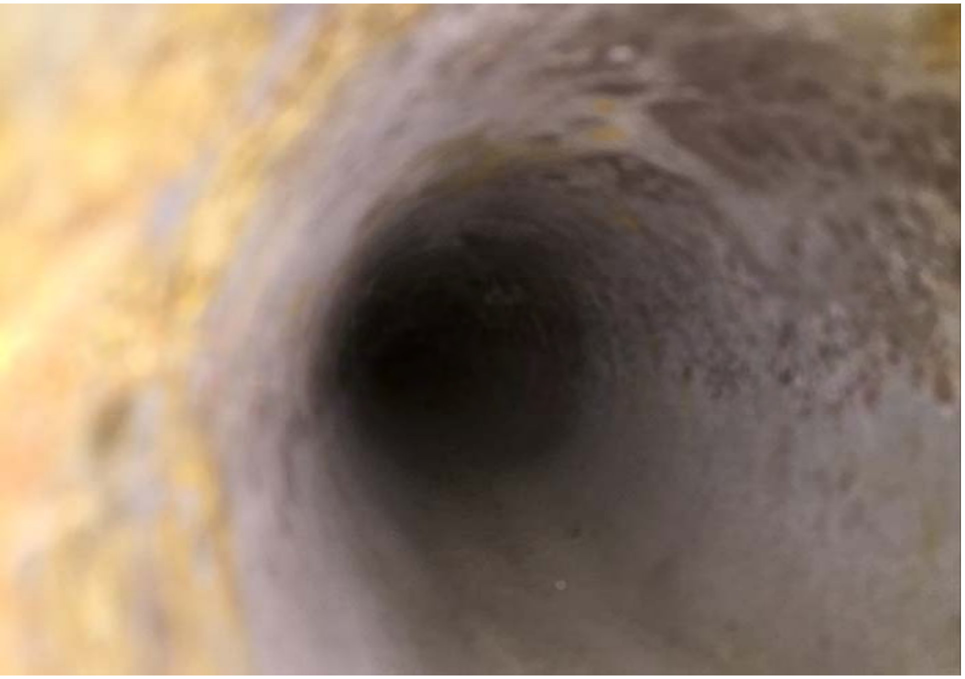

Drain Jetting Process


Flow Observed From Drain to Tank


Drain Jetting and Vacuum Truck Activities

Site Photographs

Trench Drain After Cleaning



Tank Vent Pipe Inspection

Four Inch Pipe Leading to East Tank

Four Inch Pipe Leading to West Tank

Site Photographs

East Tank Bottom Following Liquid Removal. Sediment Remains

East Tank Walls Following Liquid Removal

East Tank Bottom Following Liquid Removal. Sediment and Mortar Remains

East Tank Walls With Minor Cracks and Pitting

Site Photographs

West Tank Bottom Following Liquid Removal. Sediment Remains

West Tank Side Wall. Pitting Observed

West Tank Sidewall. Crack Observed at Seam

West Tank Side Wall. High Level Water Mark Near Tank Bottom

ANALYTICAL REPORT

Lab Number:	L1602897
Client:	Triumvirate Environmental 200 Inner Belt Road Somerville, MA 02143
ATTN:	Ryan Miller
Phone:	(617) 628-8098
Project Name:	UMASS MED-HOLDING TANK
Project Number:	700950
Report Date:	02/10/16

Certifications & Approvals: MA (M-MA086), NY (11148), CT (PH-0574), NH (2003), NJ NELAP (MA935), RI (LAO00065), ME (MA00086), PA (68-03671), VA (460195), MD (348), IL (200077), NC (666), TX (T104704476), DOD (L2217), USDA (Permit #P-330-11-00240).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: UMASS MED-HOLDING TANK
Project Number: 700950

Lab Number: L1602897
Report Date: 02/10/16

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L1602897-01	TANK COMPOSITE	WATER	UMASS MEDICAL SCHOOL	02/03/16 10:00	02/03/16
L1602897-02	TRIP BLANK	WATER	UMASS MEDICAL SCHOOL	02/03/16 00:00	02/03/16

Project Name:	UMASS MED-HOLDING TANK	**Lab Number:**	L1602897
Project Number:	700950	**Report Date:**	02/10/16

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet all of the requirements of NELAC, for all NELAC accredited parameters. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY

For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: UMASS MED-HOLDING TANK **Lab Number:** L1602897
Project Number: 700950 **Report Date:** 02/10/16

Case Narrative (continued)

Sample Receipt

A Trip Blank was received in the laboratory, but not listed on the Chain of Custody, and was not analyzed.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Lura L Troy

Title: Technical Director/Representative Date: 02/10/16

ORGANICS

VOLATILES

Project Name:	UMASS MED-HOLDING TANK	**Lab Number:**	L1602897
Project Number:	700950	**Report Date:**	02/10/16

SAMPLE RESULTS

Lab ID:	L1602897-01	Date Collected:	02/03/16 10:00
Client ID:	TANK COMPOSITE	Date Received:	02/03/16
Sample Location:	UMASS MEDICAL SCHOOL	Field Prep:	Not Specified
Matrix:	Water		
Analytical Method:	1,8260C		
Analytical Date:	02/09/16 12:05		
Analyst:	PD		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	3.0	--	1
1,1-Dichloroethane	ND		ug/l	0.75	--	1
Chloroform	ND		ug/l	0.75	--	1
Carbon tetrachloride	ND		ug/l	0.50	--	1
1,2-Dichloropropane	ND		ug/l	1.8	--	1
Dibromochloromethane	ND		ug/l	0.50	--	1
1,1,2-Trichloroethane	ND		ug/l	0.75	--	1
Tetrachloroethene	ND		ug/l	0.50	--	1
Chlorobenzene	ND		ug/l	0.50	--	1
Trichlorofluoromethane	ND		ug/l	2.5	--	1
1,2-Dichloroethane	ND		ug/l	0.50	--	1
1,1,1-Trichloroethane	ND		ug/l	0.50	--	1
Bromodichloromethane	ND		ug/l	0.50	--	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
1,1-Dichloropropene	ND		ug/l	2.5	--	1
Bromoform	ND		ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	--	1
Benzene	ND		ug/l	0.50	--	1
Toluene	ND		ug/l	0.75	--	1
Ethylbenzene	ND		ug/l	0.50	--	1
Chloromethane	ND		ug/l	2.5	--	1
Bromomethane	ND		ug/l	1.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	1.0	--	1
1,1-Dichloroethene	ND		ug/l	0.50	--	1
trans-1,2-Dichloroethene	ND		ug/l	0.75	--	1
1,2-Dichloroethene, Total	ND		ug/l	0.50	--	1
Trichloroethene	ND		ug/l	0.50	--	1

Project Name: UMASS MED-HOLDING TANK **Lab Number:** L1602897
Project Number: 700950 **Report Date:** 02/10/16

SAMPLE RESULTS

Lab ID:	L1602897-01	Date Collected:	02/03/16 10:00
Client ID:	TANK COMPOSITE	Date Received:	02/03/16
Sample Location:	UMASS MEDICAL SCHOOL	Field Prep:	Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
1,2-Dichlorobenzene	ND		ug/l	2.5	--	1
1,3-Dichlorobenzene	ND		ug/l	2.5	--	1
1,4-Dichlorobenzene	ND		ug/l	2.5	--	1
Methyl tert butyl ether	ND		ug/l	1.0	--	1
p/m-Xylene	ND		ug/l	1.0	--	1
o-Xylene	ND		ug/l	1.0	--	1
Xylenes, Total	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	ND		ug/l	0.50	--	1
Dibromomethane	ND		ug/l	5.0	--	1
1,4-Dichlorobutane	ND		ug/l	5.0	--	1
1,2,3-Trichloropropane	ND		ug/l	5.0	--	1
Styrene	ND		ug/l	1.0	--	1
Dichlorodifluoromethane	ND		ug/l	5.0	--	1
Acetone	89		ug/l	5.0	--	1
Carbon disulfide	ND		ug/l	5.0	--	1
2-Butanone	13		ug/l	5.0	--	1
Vinyl acetate	ND		ug/l	5.0	--	1
4-Methyl-2-pentanone	ND		ug/l	5.0	--	1
2-Hexanone	ND		ug/l	5.0	--	1
Ethyl methacrylate	ND		ug/l	5.0	--	1
Acrylonitrile	ND		ug/l	5.0	--	1
Bromochloromethane	ND		ug/l	2.5	--	1
Tetrahydrofuran	ND		ug/l	5.0	--	1
2,2-Dichloropropane	ND		ug/l	2.5	--	1
1,2-Dibromoethane	ND		ug/l	2.0	--	1
1,3-Dichloropropane	ND		ug/l	2.5	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	0.50	--	1
Bromobenzene	ND		ug/l	2.5	--	1
n-Butylbenzene	ND		ug/l	0.50	--	1
sec-Butylbenzene	ND		ug/l	0.50	--	1
tert-Butylbenzene	ND		ug/l	2.5	--	1
o-Chlorotoluene	ND		ug/l	2.5	--	1
p-Chlorotoluene	ND		ug/l	2.5	--	1
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	--	1
Hexachlorobutadiene	ND		ug/l	0.50	--	1
Isopropylbenzene	ND		ug/l	0.50	--	1
p-Isopropyltoluene	ND		ug/l	0.50	--	1
Naphthalene	ND		ug/l	2.5	--	1
n-Propylbenzene	ND		ug/l	0.50	--	1

Project Name: UMASS MED-HOLDING TANK **Lab Number:** L1602897

Project Number: 700950 **Report Date:** 02/10/16

SAMPLE RESULTS

Lab ID:	L1602897-01	Date Collected:	02/03/16 10:00
Client ID:	TANK COMPOSITE	Date Received:	02/03/16
Sample Location:	UMASS MEDICAL SCHOOL	Field Prep:	Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
1,2,3-Trichlorobenzene	ND		ug/l	2.5	--	1
1,2,4-Trichlorobenzene	ND		ug/l	2.5	--	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	--	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	--	1
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	--	1
Ethyl ether	ND		ug/l	2.5	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	111		70-130
Toluene-d8	95		70-130
4-Bromofluorobenzene	110		70-130
Dibromofluoromethane	87		70-130

Project Name: UMASS MED-HOLDING TANK **Lab Number:** L1602897

Project Number: 700950 **Report Date:** 02/10/16

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 02/09/16 10:11
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG863766-3					
Methylene chloride	ND		ug/l	3.0	--
1,1-Dichloroethane	ND		ug/l	0.75	--
Chloroform	ND		ug/l	0.75	--
Carbon tetrachloride	ND		ug/l	0.50	--
1,2-Dichloropropane	ND		ug/l	1.8	--
Dibromochloromethane	ND		ug/l	0.50	--
1,1,2-Trichloroethane	ND		ug/l	0.75	--
2-Chloroethylvinyl ether	ND		ug/l	10	--
Tetrachloroethene	ND		ug/l	0.50	--
Chlorobenzene	ND		ug/l	0.50	--
Trichlorofluoromethane	ND		ug/l	2.5	--
1,2-Dichloroethane	ND		ug/l	0.50	--
1,1,1-Trichloroethane	ND		ug/l	0.50	--
Bromodichloromethane	ND		ug/l	0.50	--
trans-1,3-Dichloropropene	ND		ug/l	0.50	--
cis-1,3-Dichloropropene	ND		ug/l	0.50	--
1,3-Dichloropropene, Total	ND		ug/l	0.50	--
1,1-Dichloropropene	ND		ug/l	2.5	--
Bromoform	ND		ug/l	2.0	--
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	--
Benzene	ND		ug/l	0.50	--
Toluene	ND		ug/l	0.75	--
Ethylbenzene	ND		ug/l	0.50	--
Chloromethane	ND		ug/l	2.5	--
Bromomethane	ND		ug/l	1.0	--
Vinyl chloride	ND		ug/l	1.0	--
Chloroethane	ND		ug/l	1.0	--
1,1-Dichloroethene	ND		ug/l	0.50	--
trans-1,2-Dichloroethene	ND		ug/l	0.75	--

Project Name: UMASS MED-HOLDING TANK **Lab Number:** L1602897
Project Number: 700950 **Report Date:** 02/10/16

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 02/09/16 10:11
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG863766-3					
1,2-Dichloroethene, Total	ND		ug/l	0.50	--
Trichloroethene	ND		ug/l	0.50	--
1,2-Dichlorobenzene	ND		ug/l	2.5	--
1,3-Dichlorobenzene	ND		ug/l	2.5	--
1,4-Dichlorobenzene	ND		ug/l	2.5	--
Methyl tert butyl ether	ND		ug/l	1.0	--
p/m-Xylene	ND		ug/l	1.0	--
o-Xylene	ND		ug/l	1.0	--
Xylenes, Total	ND		ug/l	1.0	--
cis-1,2-Dichloroethene	ND		ug/l	0.50	--
Dibromomethane	ND		ug/l	5.0	--
1,4-Dichlorobutane	ND		ug/l	5.0	--
Iodomethane	ND		ug/l	5.0	--
1,2,3-Trichloropropane	ND		ug/l	5.0	--
Styrene	ND		ug/l	1.0	--
Dichlorodifluoromethane	ND		ug/l	5.0	--
Acetone	ND		ug/l	5.0	--
Carbon disulfide	ND		ug/l	5.0	--
2-Butanone	ND		ug/l	5.0	--
Vinyl acetate	ND		ug/l	5.0	--
4-Methyl-2-pentanone	ND		ug/l	5.0	--
2-Hexanone	ND		ug/l	5.0	--
Ethyl methacrylate	ND		ug/l	5.0	--
Acrolein	ND		ug/l	5.0	--
Acrylonitrile	ND		ug/l	5.0	--
Bromochloromethane	ND		ug/l	2.5	--
Tetrahydrofuran	ND		ug/l	5.0	--
2,2-Dichloropropane	ND		ug/l	2.5	--
1,2-Dibromoethane	ND		ug/l	2.0	--

Project Name: UMASS MED-HOLDING TANK **Lab Number:** L1602897
Project Number: 700950 **Report Date:** 02/10/16

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 02/09/16 10:11
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG863766-3					
1,3-Dichloropropane	ND		ug/l	2.5	--
1,1,1,2-Tetrachloroethane	ND		ug/l	0.50	--
Bromobenzene	ND		ug/l	2.5	--
n-Butylbenzene	ND		ug/l	0.50	--
sec-Butylbenzene	ND		ug/l	0.50	--
tert-Butylbenzene	ND		ug/l	2.5	--
o-Chlorotoluene	ND		ug/l	2.5	--
p-Chlorotoluene	ND		ug/l	2.5	--
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	--
Hexachlorobutadiene	ND		ug/l	0.50	--
Isopropylbenzene	ND		ug/l	0.50	--
p-Isopropyltoluene	ND		ug/l	0.50	--
Naphthalene	ND		ug/l	2.5	--
n-Propylbenzene	ND		ug/l	0.50	--
1,2,3-Trichlorobenzene	ND		ug/l	2.5	--
1,2,4-Trichlorobenzene	ND		ug/l	2.5	--
1,3,5-Trimethylbenzene	ND		ug/l	2.5	--
1,3,5-Trichlorobenzene	ND		ug/l	2.0	--
1,2,4-Trimethylbenzene	ND		ug/l	2.5	--
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	--
Halothane	ND		ug/l	2.5	--
Ethyl ether	ND		ug/l	2.5	--
Methyl Acetate	ND		ug/l	10	--
Ethyl Acetate	ND		ug/l	10	--
Isopropyl Ether	ND		ug/l	2.0	--
Cyclohexane	ND		ug/l	10	--
Tert-Butyl Alcohol	ND		ug/l	10	--
Ethyl-Tert-Butyl-Ether	ND		ug/l	2.0	--
Tertiary-Amyl Methyl Ether	ND		ug/l	2.0	--

Project Name: UMASS MED-HOLDING TANK **Lab Number:** L1602897
Project Number: 700950 **Report Date:** 02/10/16

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 02/09/16 10:11
Analyst: PD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 01 Batch: WG863766-3					
1,4-Dioxane	ND		ug/l	250	--
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		ug/l	10	--
Methyl cyclohexane	ND		ug/l	10	--
p-Diethylbenzene	ND		ug/l	2.0	--
4-Ethyltoluene	ND		ug/l	2.0	--
1,2,4,5-Tetramethylbenzene	ND		ug/l	2.0	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	86		70-130
Toluene-d8	96		70-130
4-Bromofluorobenzene	106		70-130
Dibromofluoromethane	85		70-130

Lab Control Sample Analysis
Batch Quality Control

Project Name: UMASS MED-HOLDING TANK
Project Number: 700950
Lab Number: L1602897
Report Date: 02/10/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG863766-1 WG863766-2								
Methylene chloride	97		86		70-130	12		20
1,1-Dichloroethane	99		88		70-130	12		20
Chloroform	97		85		70-130	13		20
Carbon tetrachloride	91		79		63-132	14		20
1,2-Dichloropropane	102		90		70-130	13		20
Dibromochloromethane	86		75		63-130	14		20
1,1,2-Trichloroethane	95		84		70-130	12		20
2-Chloroethylvinyl ether	79		**66**	Q	70-130	18		20
Tetrachloroethene	97		85		70-130	13		20
Chlorobenzene	99		88		75-130	12		25
Trichlorofluoromethane	76		67		62-150	13		20
1,2-Dichloroethane	89		79		70-130	12		20
1,1,1-Trichloroethane	96		83		67-130	15		20
Bromodichloromethane	92		80		67-130	14		20
trans-1,3-Dichloropropene	87		77		70-130	12		20
cis-1,3-Dichloropropene	92		80		70-130	14		20
1,1-Dichloropropene	105		92		70-130	13		20
Bromoform	81		71		54-136	13		20
1,1,2,2-Tetrachloroethane	92		81		67-130	13		20
Benzene	104		92		70-130	12		25
Toluene	104		92		70-130	12		25

Lab Control Sample Analysis
Batch Quality Control

Project Name: UMASS MED-HOLDING TANK
Project Number: 700950
Lab Number: L1602897
Report Date: 02/10/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG863766-1 WG863766-2								
Ethylbenzene	106		93		70-130	13		20
Chloromethane	92		80		64-130	14		20
Bromomethane	94		84		39-139	11		20
Vinyl chloride	87		76		55-140	13		20
Chloroethane	86		76		55-138	12		20
1,1-Dichloroethene	93		82		61-145	13		25
trans-1,2-Dichloroethene	101		88		70-130	14		20
Trichloroethene	98		86		70-130	13		25
1,2-Dichlorobenzene	96		86		70-130	11		20
1,3-Dichlorobenzene	100		89		70-130	12		20
1,4-Dichlorobenzene	98		86		70-130	13		20
Methyl tert butyl ether	94		83		63-130	12		20
p/m-Xylene	110		97		70-130	13		20
o-Xylene	111		98		70-130	12		20
cis-1,2-Dichloroethene	101		89		70-130	13		20
Dibromomethane	88		78		70-130	12		20
1,4-Dichlorobutane	98		88		70-130	11		20
Iodomethane	**54**	Q	**54**	Q	70-130	0		20
1,2,3-Trichloropropane	98		86		64-130	13		20
Styrene	108		95		70-130	13		20
Dichlorodifluoromethane	67		60		36-147	11		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: UMASS MED-HOLDING TANK
Project Number: 700950

Lab Number: L1602897
Report Date: 02/10/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG863766-1 WG863766-2								
Acetone	105		80		58-148	**27**	Q	20
Carbon disulfide	96		83		51-130	15		20
2-Butanone	98		86		63-138	13		20
Vinyl acetate	93		82		70-130	13		20
4-Methyl-2-pentanone	88		77		59-130	13		20
2-Hexanone	77		67		57-130	14		20
Ethyl methacrylate	80		70		70-130	13		20
Acrolein	76		**69**	Q	70-130	10		20
Acrylonitrile	92		80		70-130	14		20
Bromochloromethane	90		80		70-130	12		20
Tetrahydrofuran	108		94		58-130	14		20
2,2-Dichloropropane	102		91		63-133	11		20
1,2-Dibromoethane	90		81		70-130	11		20
1,3-Dichloropropane	98		87		70-130	12		20
1,1,1,2-Tetrachloroethane	92		81		64-130	13		20
Bromobenzene	101		90		70-130	12		20
n-Butylbenzene	106		91		53-136	15		20
sec-Butylbenzene	102		88		70-130	15		20
tert-Butylbenzene	102		89		70-130	14		20
o-Chlorotoluene	112		98		70-130	13		20
p-Chlorotoluene	113		100		70-130	12		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: UMASS MED-HOLDING TANK

Project Number: 700950

Lab Number: L1602897

Report Date: 02/10/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG863766-1 WG863766-2								
1,2-Dibromo-3-chloropropane	84		76		41-144	10		20
Hexachlorobutadiene	91		80		63-130	13		20
Isopropylbenzene	110		96		70-130	14		20
p-Isopropyltoluene	101		88		70-130	14		20
Naphthalene	**47**	Q	**46**	Q	70-130	2		20
n-Propylbenzene	113		97		69-130	15		20
1,2,3-Trichlorobenzene	**45**	Q	**47**	Q	70-130	4		20
1,2,4-Trichlorobenzene	**62**	Q	**58**	Q	70-130	7		20
1,3,5-Trimethylbenzene	112		97		64-130	14		20
1,3,5-Trichlorobenzene	88		79		70-130	11		20
1,2,4-Trimethylbenzene	106		92		70-130	14		20
trans-1,4-Dichloro-2-butene	84		74		70-130	13		20
Halothane	96		85		70-130	12		20
Ethyl ether	87		76		59-134	13		20
Methyl Acetate	91		82		70-130	10		20
Ethyl Acetate	94		81		70-130	15		20
Isopropyl Ether	107		95		70-130	12		20
Cyclohexane	99		89		70-130	11		20
Tert-Butyl Alcohol	96		87		70-130	10		20
Ethyl-Tert-Butyl-Ether	104		91		70-130	13		20
Tertiary-Amyl Methyl Ether	91		81		66-130	12		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: UMASS MED-HOLDING TANK
Lab Number: L1602897
Project Number: 700950
Report Date: 02/10/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 01 Batch: WG863766-1 WG863766-2								
1,4-Dioxane	150		129		56-162	15		20
1,1,2-Trichloro-1,2,2-Trifluoroethane	91		81		70-130	12		20
Methyl cyclohexane	98		86		70-130	13		20
p-Diethylbenzene	101		87		70-130	15		20
4-Ethyltoluene	117		102		70-130	14		20
1,2,4,5-Tetramethylbenzene	91		81		70-130	12		20

Surrogate	*LCS %Recovery*	*Qual*	*LCSD %Recovery*	*Qual*	*Acceptance Criteria*
1,2-Dichloroethane-d4	85		85		70-130
Toluene-d8	96		97		70-130
4-Bromofluorobenzene	105		106		70-130
Dibromofluoromethane	88		88		70-130

METALS

Project Name:	UMASS MED-HOLDING TANK	**Lab Number:**	L1602897
Project Number:	700950	**Report Date:**	02/10/16

SAMPLE RESULTS

Lab ID:	L1602897-01	Date Collected:	02/03/16 10:00
Client ID:	TANK COMPOSITE	Date Received:	02/03/16
Sample Location:	UMASS MEDICAL SCHOOL	Field Prep:	Not Specified
Matrix:	Water	TCLP/SPLP Ext. Date:	02/06/16 16:36

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
TCLP Metals by EPA 1311 - Westborough Lab											
Arsenic, TCLP	ND		mg/l	1.0	--	1	02/09/16 07:47	02/09/16 12:00	EPA 3015	1,6010C	PS
Barium, TCLP	ND		mg/l	0.50	--	1	02/09/16 07:47	02/09/16 12:00	EPA 3015	1,6010C	PS
Cadmium, TCLP	0.17		mg/l	0.10	--	1	02/09/16 07:47	02/09/16 12:00	EPA 3015	1,6010C	PS
Chromium, TCLP	ND		mg/l	0.20	--	1	02/09/16 07:47	02/09/16 12:00	EPA 3015	1,6010C	PS
Lead, TCLP	ND		mg/l	0.50	--	1	02/09/16 07:47	02/09/16 12:00	EPA 3015	1,6010C	PS
Mercury, TCLP	ND		mg/l	0.0010	--	1	02/08/16 13:45	02/10/16 00:18	EPA 7470A	1,7470A	EA
Selenium, TCLP	ND		mg/l	0.50	--	1	02/09/16 07:47	02/09/16 12:00	EPA 3015	1,6010C	PS
Silver, TCLP	ND		mg/l	0.10	--	1	02/09/16 07:47	02/09/16 12:00	EPA 3015	1,6010C	PS

Project Name: UMASS MED-HOLDING TANK **Lab Number:** L1602897
Project Number: 700950 **Report Date:** 02/10/16

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
TCLP Metals by EPA 1311 - Westborough Lab for sample(s): 01 Batch: WG863539-1										
Mercury, TCLP	ND		mg/l	0.0010	--	1	02/08/16 13:45	02/10/16 00:14	1,7470A	EA

Prep Information

Digestion Method: EPA 7470A
TCLP/SPLP Extraction Date: 02/06/16 16:36

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
TCLP Metals by EPA 1311 - Westborough Lab for sample(s): 01 Batch: WG863659-1										
Arsenic, TCLP	ND		mg/l	1.0	--	1	02/09/16 07:47	02/09/16 10:42	1,6010C	PS
Barium, TCLP	ND		mg/l	0.50	--	1	02/09/16 07:47	02/09/16 10:42	1,6010C	PS
Cadmium, TCLP	ND		mg/l	0.10	--	1	02/09/16 07:47	02/09/16 10:42	1,6010C	PS
Chromium, TCLP	ND		mg/l	0.20	--	1	02/09/16 07:47	02/09/16 10:42	1,6010C	PS
Lead, TCLP	ND		mg/l	0.50	--	1	02/09/16 07:47	02/09/16 10:42	1,6010C	PS
Selenium, TCLP	ND		mg/l	0.50	--	1	02/09/16 07:47	02/09/16 10:42	1,6010C	PS
Silver, TCLP	ND		mg/l	0.10	--	1	02/09/16 07:47	02/09/16 10:42	1,6010C	PS

Prep Information

Digestion Method: EPA 3015
TCLP/SPLP Extraction Date: 02/06/16 16:36

Lab Control Sample Analysis
Batch Quality Control

Project Name: UMASS MED-HOLDING TANK

Project Number: 700950

Lab Number: L1602897

Report Date: 02/10/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
TCLP Metals by EPA 1311 - Westborough Lab Associated sample(s): 01 Batch: WG863539-2								
Mercury, TCLP	113		-		80-120	-		
TCLP Metals by EPA 1311 - Westborough Lab Associated sample(s): 01 Batch: WG863659-2								
Arsenic, TCLP	100		-		75-125	-		20
Barium, TCLP	90		-		75-125	-		20
Cadmium, TCLP	98		-		75-125	-		20
Chromium, TCLP	90		-		75-125	-		20
Lead, TCLP	94		-		75-125	-		20
Selenium, TCLP	100		-		75-125	-		20
Silver, TCLP	90		-		75-125	-		20

Matrix Spike Analysis
Batch Quality Control

Project Name: UMASS MED-HOLDING TANK
Project Number: 700950
Lab Number: L1602897
Report Date: 02/10/16

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
TCLP Metals by EPA 1311 - Westborough Lab Associated sample(s): 01 QC Batch ID: WG863539-4 QC Sample: L1602897-01 Client ID: TANK COMPOSITE												
Mercury, TCLP	ND	0.025	0.0270	108		-	-		80-120	-		20
TCLP Metals by EPA 1311 - Westborough Lab Associated sample(s): 01 QC Batch ID: WG863659-4 QC Sample: L1602821-01 Client ID: MS Sample												
Arsenic, TCLP	ND	1.2	1.1	92		-	-		75-125	-		20
Barium, TCLP	ND	20	18	90		-	-		75-125	-		20
Cadmium, TCLP	ND	0.51	0.48	94		-	-		75-125	-		20
Chromium, TCLP	ND	2	1.8	90		-	-		75-125	-		20
Lead, TCLP	ND	5.1	4.8	94		-	-		75-125	-		20
Selenium, TCLP	ND	1.2	1.1	92		-	-		75-125	-		20
Silver, TCLP	ND	0.5	0.44	88		-	-		75-125	-		20

Lab Duplicate Analysis

Batch Quality Control

Project Name: UMASS MED-HOLDING TANK
Project Number: 700950
Lab Number: L1602897
Report Date: 02/10/16

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
TCLP Metals by EPA 1311 - Westborough Lab Associated sample(s): 01 QC Batch ID: WG863539-3 QC Sample: L1602897-01 Client ID: TANK COMPOSITE						
Mercury, TCLP	ND	ND	mg/l	NC		20
TCLP Metals by EPA 1311 - Westborough Lab Associated sample(s): 01 QC Batch ID: WG863659-3 QC Sample: L1602821-01 Client ID: DUP Sample						
Arsenic, TCLP	ND	ND	mg/l	NC		20
Barium, TCLP	ND	ND	mg/l	NC		20
Cadmium, TCLP	ND	ND	mg/l	NC		20
Chromium, TCLP	ND	ND	mg/l	NC		20
Lead, TCLP	ND	ND	mg/l	NC		20
Selenium, TCLP	ND	ND	mg/l	NC		20
Silver, TCLP	ND	ND	mg/l	NC		20

INORGANICS
&
MISCELLANEOUS

Project Name: UMASS MED-HOLDING TANK | **Lab Number:** L1602897
Project Number: 700950 | **Report Date:** 02/10/16

SAMPLE RESULTS

Lab ID: L1602897-01
Client ID: TANK COMPOSITE
Sample Location: UMASS MEDICAL SCHOOL
Matrix: Water

Date Collected: 02/03/16 10:00
Date Received: 02/03/16
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab										
pH (H)	8.4		SU	-	NA	1	-	02/03/16 23:02	1,9040C	AS
Flash Point	>150		deg F	70	NA	1	-	02/08/16 20:30	1,1010A	SB
Cyanide, Reactive	ND		mg/l	1.0	--	1	02/09/16 23:10	02/10/16 01:10	1,7.3	TL
Sulfide, Reactive	ND		mg/l	1.0	--	1	02/09/16 23:10	02/10/16 00:44	1,7.3	TL

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG863866-1										
Cyanide, Reactive	ND		mg/l	1.0	--	1	02/09/16 23:10	02/10/16 01:03	1,7.3	TL
General Chemistry - Westborough Lab for sample(s): 01 Batch: WG863868-1										
Sulfide, Reactive	ND		mg/l	1.0	--	1	02/09/16 23:10	02/10/16 00:43	1,7.3	TL

Lab Control Sample Analysis
Batch Quality Control

Project Name: UMASS MED-HOLDING TANK
Project Number: 700950

Lab Number: L1602897
Report Date: 02/10/16

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG862629-1								
pH	100		-		99-101	-		5
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG863608-1								
Flash Point	101		-		96-104	-		
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG863866-2								
Cyanide, Reactive	77		-		30-125	-		25
General Chemistry - Westborough Lab Associated sample(s): 01 Batch: WG863868-2								
Sulfide, Reactive	94		-		60-125	-		25

Lab Duplicate Analysis
Batch Quality Control

Project Name: UMASS MED-HOLDING TANK
Project Number: 700950

Lab Number: L1602897
Report Date: 02/10/16

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG862629-2 QC Sample: L1602897-01 Client ID: TANK COMPOSITE						
pH (H)	8.4	8.4	SU	0		5
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG863866-3 QC Sample: L1602897-01 Client ID: TANK COMPOSITE						
Cyanide, Reactive	ND	ND	mg/l	NC		25
General Chemistry - Westborough Lab Associated sample(s): 01 QC Batch ID: WG863868-3 QC Sample: L1602897-01 Client ID: TANK COMPOSITE						
Sulfide, Reactive	ND	ND	mg/l	NC		25

Project Name: UMASS MED-HOLDING TANK
Lab Number: L1602897
Project Number: 700950
Report Date: 02/10/16

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1602897-01A	Vial HCl preserved	A	N/A	2.6	Y	Absent	8260(14)
L1602897-01B	Vial HCl preserved	A	N/A	2.6	Y	Absent	8260(14)
L1602897-01C	Vial HCl preserved	A	N/A	2.6	Y	Absent	8260(14)
L1602897-01D	Plastic 950ml unpreserved	A	8	2.6	Y	Absent	PH-9040(1)
L1602897-01F	Amber 500ml unpreserved	A	8	2.6	Y	Absent	REACTS(7),REACTCN(7),FLASH ()
L1602897-01W	Plastic 120ml HNO3 preserved spl	A	<2	2.6	Y	Absent	CD-CI(180),AS-CI(180),BA-CI(180),HG-C(28),PB-CI(180),CR-CI(180),SE-CI(180),AG-CI(180)
L1602897-01W9	Tumble Vessel	A	N/A	2.6	Y	Absent	-
L1602897-02A	Vial HCl preserved	A	N/A	2.6	Y	Absent	HOLD-8260(14)
L1602897-02B	Vial HCl preserved	A	N/A	2.6	Y	Absent	HOLD-8260(14)

Container Comments

L1602897-01B

*Values in parentheses indicate holding time in days

GLOSSARY

Acronyms

EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

Project Name:	UMASS MED-HOLDING TANK	**Lab Number:**	L1602897
Project Number:	700950	**Report Date:**	02/10/16

Data Qualifiers

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the reporting limit (RL) for the sample.

Report Format: Data Usability Report

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - IV, 2007.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 524.2: 1,2-Dibromo-3-chloropropane, 1,2-Dibromoethane, m/p-xylene, o-xylene
EPA 624: 2-Butanone (MEK), 1,4-Dioxane, tert-Amylmethyl Ether, tert-Butyl Alcohol, m/p-xylene, o-xylene
EPA 625: Aniline, Benzoic Acid, Benzyl Alcohol, 4-Chloroaniline, 3-Methylphenol, 4-Methylphenol.
EPA 1010A: NPW: Ignitability
EPA 6010C: NPW: Strontium; SCM: Strontium
EPA 8151A: NPW: 2,4-DB, Dicamba, Dichloroprop, MCPA, MCPP; SCM: 2,4-DB, Dichloroprop, MCPA, MCPP
EPA 8260C: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene, Isopropanol; SCM: Iodomethane (methyl iodide), Methyl methacrylate (soil); 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D: NPW: Pentachloronitrobenzene, 1-Methylnaphthalene, Dimethylnaphthalene,1,4-Diphenylhydrazine; SCM: Pentachloronitrobenzene, 1-Methylnaphthalene, Dimethylnaphthalene,1,4-Diphenylhydrazine.
EPA 9010: NPW: Amenable Cyanide Distillation, Total Cyanide Distillation
EPA 9038: NPW: Sulfate
EPA 9050A: NPW: Specific Conductance
EPA 9056: NPW: Chloride, Nitrate, Sulfate
EPA 9065: NPW: Phenols
EPA 9251: NPW: Chloride
SM3500: NPW: Ferrous Iron
SM4500: NPW: Amenable Cyanide, Dissolved Oxygen; SCM: Total Phosphorus, TKN, NO2, NO3.
SM5310C: DW: Dissolved Organic Carbon

Mansfield Facility
EPA 8270D: NPW: Biphenyl; SCM: Biphenyl, Caprolactam
EPA 8270D-SIM Isotope Dilution: SCM: 1,4-Dioxane
SM 2540D: TSS
SM2540G: SCM: Percent Solids
EPA 1631E: SCM: Mercury
EPA 7474: SCM: Mercury
EPA 8081B: NPW and SCM: Mirex, Hexachlorobenzene.
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA 8270-SIM: NPW and SCM: Alkylated PAHs.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene, n-Butylbenzene, n-Propylbenzene, sec-Butylbenzene, tert-Butylbenzene.
Biological Tissue Matrix: ***8270D-SIM; 3050B; 3051A; 7471B; 8081B; 8082A; 6020A:*** Lead***; 8270D:*** bis(2-ethylhexyl)phthalate, Butylbenzylphthalate, Diethyl phthalate, Dimethyl phthalate, Di-n-butyl phthalate, Di-n-octyl phthalate, Fluoranthene, Pentachlorophenol.

The following analytes are included in our Massachusetts DEP Scope of Accreditation, Westborough Facility:

Drinking Water
EPA 200.8: Sb,As,Ba,Be,Cd,Cr,Cu,Pb,Ni,Se,Tl; **EPA 200.7**: Ba,Be,Ca,Cd,Cr,Cu,Na; **EPA 245.1:** Mercury;
EPA 300.0: Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B**
EPA 332: Perchlorate.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT, Enterolert-QT.**

Non-Potable Water
EPA 200.8: Al,Sb,As,Be,Cd,Cr,Cu,Pb,Mn,Ni,Se,Ag,Tl,Zn;
EPA 200.7: Al,Sb,As,Be,Cd,Ca,Cr,Co,Cu,Fe,Pb,Mg,Mn,Mo,Ni,K,Se,Ag,Na,Sr,Ti,Tl,V,Zn;
EPA 245.1, SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2340B, SM2320B, SM4500CL-E, SM4500F-BC, SM426C, SM4500NH3-BH, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **SM4500NO3-F,**
EPA 353.2: Nitrate-N**, SM4500NH3-BC-NES, EPA 351.1, SM4500P-E, SM4500P-B, E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, SM14 510AC, EPA 420.1, SM4500-CN-CE, SM2540D.**
EPA 624: Volatile Halocarbons & Aromatics,
EPA 608: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9222D-MF**.

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

PAGE 1 OF 1

ALPHA ANALYTICAL

8 Walkup Drive
Westboro, MA 01581
Tel: 508-898-9220

320 Forbes Blvd
Mansfield, MA 02048
Tel: 508-822-9300

Date Rec'd in Lab: 2/3/16

ALPHA Job #: L1602897

Project Information

Project Name: UMASS Med-Holding Tanks

Project Location: UMASS Medical School

Project #: 700950

Project Manager: Ryan Miller

ALPHA Quote #:

Report Information - Data Deliverables

☐ ADEx ☒ EMAIL

Billing Information

☐ Same as Client info PO #: NE53520

Client Information

Client: Triumvirate Environmental

Address: 200 Inner Belt Rd Somerville, MA 02143

Phone: 617-875-6002

Email: rmiller@triumvirate.com

Regulatory Requirements & Project Information Requirements

☐ Yes ☒ No MA MCP Analytical Methods ☐ Yes ☒ No CT RCP Analytical Methods

☐ Yes ☒ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)

☐ Yes ☒ No GW1 Standards (Info Required for Metals & EPH with Targets)

☐ Yes ☒ No NPDES RGP

☐ Other State /Fed Program ______ Criteria ______

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved!)

Date Due:

Additional Project Information:

ANALYSIS

VOC: ☒ 8260 ☐ 624 ☐ 524.2 | SVOC: ☐ ABN ☐ PAH | METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15 | METALS: ☐ RCRA5 ☒ RCRA8 (TCLP) ☐ PP13 | EPH: ☐ Ranges & Targets ☐ Ranges Only | VPH: ☐ Ranges & Targets ☐ Ranges Only | ☐ PCB ☐ PEST | TPH: ☐ Quant Only ☐ Fingerprint | pH | Reactivity (Cyanide + Sulfide) | Flash Point

SAMPLE INFO: *Filtration* ☐ Field ☐ Lab to do; *Preservation* ☐ Lab to do

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	VOC	SVOC	METALS	METALS	EPH	VPH	PCB/PEST	TPH	pH	Reactivity (Cyanide + Sulfide)	Flash Point	Sample Comments	TOTAL # BOTTLES
02897-01	Tank Composite	2/3/16	10:00	Water/Sediment	RMM	X			X					X	X	X		5
	Container Type					V			P					P	A	A		
	Preservative					B			A					A	A	A		

RMM

Container Type	Preservative
P= Plastic	A= None
A= Amber glass	B= HCl
V= Vial	C= HNO_3
G= Glass	D= H_2SO_4
B= Bacteria cup	E= NaOH
C= Cube	F= MeOH
O= Other	G= $NaHSO_4$
E= Encore	H = $Na_2S_2O_3$
D= BOD Bottle	I= Ascorbic Acid
	J = NH_4Cl
	K= Zn Acetate
	O= Other

Relinquished By:	Date/Time	Received By:	Date/Time
Ryan Miller	2/3/16 12:20	[illegible] AAL	2/3/16 1600
[illegible]	2/3/16 1818	[illegible]	2/3/16 1818

SIMPSON GUMPERTZ & HEGER
Engineering of Structures and Building Enclosures

30 November 2016
(Revised 1 December 2016)

Mr. Mark E. Armington
Senior Director
Facilities Engineering and Construction
University of Massachusetts Medical School
55 Lake Avenue North
Worcester, MA 01655

Project 150993.02 – Bunker Holding Tanks – University of Massachusetts Medical School, Worcester, MA

Dear Mr. Armington:

At your request, we reviewed Drawing Sheet P38 and the Triumvirate Environmental report dated 13 May 2016, provided by you, to understand your need to abandon in-place the drainage system at the bunker holding tanks. We understand that the drainage system previously provided storage capacity for the servicing of waste and flammable storage bunkers located at the University of Massachusetts Medical School, Worcester, Massachusetts.

The removal of the tanks is impeded by their depth and proximity to the loading dock foundation wall. You requested that we review the proposed option to fill the tanks and piping in order to abandon in-place. Per our review, the existing piping, tanks, manhole, and trench drains can be filled with flowable fill and capped with concrete.

We suggest that you fill the tanks first and then fill the piping in a sequence from the lowest to the highest trench drain in order to backfill the system using the slope of the piping.

Sincerely yours,

COMMONWEALTH OF MASSACHUSETTS
GREGGREY G. COHEN
STRUCTURAL
No. 37140
REGISTERED
PROFESSIONAL ENGINEER

Paul M. Millette

Greggrey G. Cohen, P.E.
Principal
MA License No. 37140

Paul M. Millette
Senior Project Supervisor

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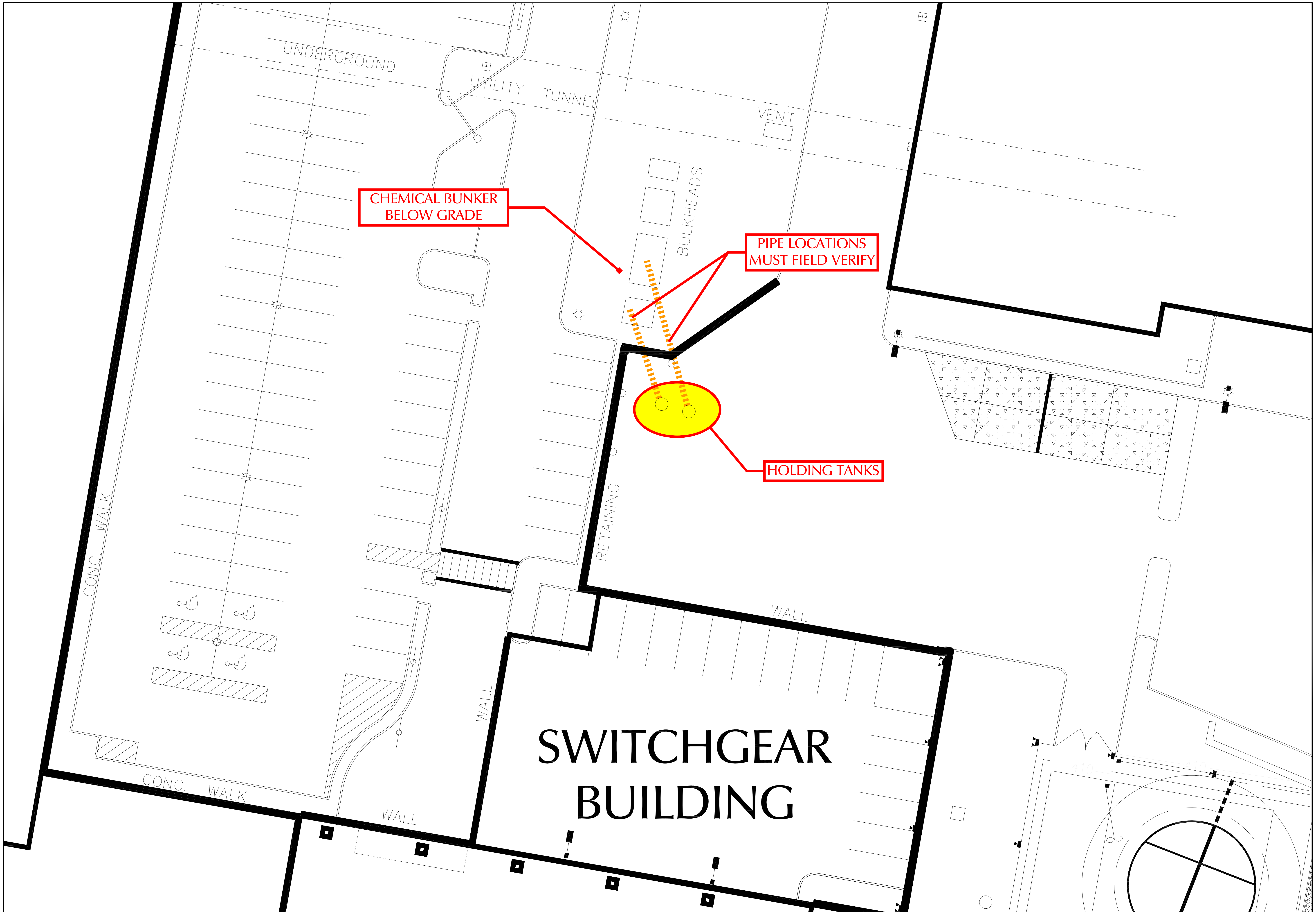

UMASS
University of Massachusetts
Medical School

Department of
Facilities Management
Power Plant : Level Two
55 Lake Avenue North
Worcester, Massachusetts 01655

NORTH

PROJECT

UMASS MEDICAL SCHOOL

UMASS
WORCESTER
UNIVERSITY
CAMPUS

GENERAL PLAN OF CAMPUS

DRAWING TITLE

HOLDING TANKS
LOCUS PLAN

REVISIONS

NO.	DESCRIPTION	DATE

FILE: Site Background_102909

DWN. BY: RBH/JD

CKD. BY: RBH

JOB NO: 908-2013

SCALE: NTS

DATE: 10/27/2015

Q
1

R:\FEC-As-Built\Site\Site\Master File\Background\Site Background_102909.dwg

Appendix B: Winter Road Maintenance Best Practices Details

Equipment and Maintenance

UMass Chan Medical School will implement the following winter maintenance procedures to reduce the discharge of pollutants from the MS4:

- Calibrate equipment to reduce and optimize salt use and ensure deicing agents are being used efficiently. Provide employee training on proper calibration procedures.
- Do not overfill trucks with deicing materials as it may lead to spills.
- Optimize sand and/or chemical application rates through the use, where practicable, of automated application equipment (e.g., zero velocity spreaders), anti-icing and pre-wetting techniques, implementation of pavement management systems, and alternate chemicals.
- When possible, retrofit vehicles to include equipment such as on-board application regulators, temperature sensors for air and pavement, and anti-icing and pre-wetting equipment.
- Wash equipment using proper procedures to prevent pollutants from entering the stormwater system. Dry cleanup procedures should be used when possible. Vehicles dirtied from salt or sand application should be washed according to procedures in Section 4. Vehicles and Equipment.
- Regularly inspect and maintain equipment to reduce the potential for leaks. See Section 4. Vehicles and Equipment.

Anti-icing and Deicing

- Minimize the use and optimize the application of sodium chloride and other salt[4] (while maintaining public safety) and consider opportunities for use of alternative materials (e.g., calcium magnesium acetate, magnesium chloride, or calcium chloride).
- Remove as much snow as possible using mechanical means like plowing, blowing, or shoveling before deicing to reduce the need for road salt or other deicing chemicals.
- When possible, use anti-icing practices to prevent ice formation and reduce the need for deicers. Apply anti-icing agents 1-2 hours before winter weather events to ensure optimal performance (can be applied up to 24 prior).
- Only apply road salt when the pavement temperature is above 15° F.
- When using deicers, use pre-wetting agents (e.g., salt brine) to help them work more efficiently and to reduce road salt scatter and bounce.
- Salt brine solution used for anti-icing and pre-wetting can be stored for up to a year – concentration should be tested before use. If temperatures fall below 0° F, use a circulator pump to prevent the brine from freezing.
- Avoid mixing road salt and sand. Doing so makes both the salt and sand work less efficiently and leads to over-application.

[4] For purposes of the MS4 Permit, salt means any chloride-containing material used to treat paved surfaces for deicing, including sodium chloride, calcium chloride, magnesium chloride, and brine solutions.

- Only apply enough deicer so that plows can remove the snow and ice. Adjust the application rate of deicers based on the type of storm, type of agent used, and anti-icing and pre-wetting techniques used.
- Track the amount of deicer used and maintain records of the application of sand, anti-icing and/or de-icing chemicals to document the reduction of chemicals to meet established goals.

Storage of Deicing Materials

- Prevent exposure of deicing product (salt, sand, or alternative products) storage piles to precipitation by enclosing or covering the storage piles. Implement good housekeeping, diversions, containment or other measures to minimize exposure resulting from adding to or removing materials from the pile. Store piles in such a manner as not to impact surface water resources, groundwater resources, recharge areas, and wells.
- Store materials under covered or enclosed areas and on impervious surfaces.
- Ensure that there are adequate drainage controls in storage areas to prevent runoff from entering the stormwater system.
- Perform unloading/loading of trucks on impervious surfaces whenever possible. These areas should be frequently cleaned and swept to reduce the tracking and runoff of salt and to capture any spills.
- For liquid deicing chemicals, provide secondary storage containment.
- Do not store road salt near drinking water supplies, surface water resources, groundwater resources, recharge areas, and wells. Follow proper storage guidelines from MassDEP (https://www.mass.gov/guides/guidelines-on-road-salt-storage).

Snow Storage and Disposal

- The MS4 Permit prohibits snow disposal into waters of the United States. Snow disposal and storage activities, including selection of appropriate snow disposal sites, will adhere to the MassDEP Snow Disposal Guidance, Guideline No. BWR G2015-01 (http://www.mass.gov/eea/agencies/massdep/water/regulations/snow-disposal-guidance.html).
- Snow should not be pushed or dumped into waterbodies or wetlands, into stormwater drainage swales or ditches, or on top of catch basins.
- Snow should not be stored near drinking water areas, waterbodies, or wetlands.

UMass Chan Medical School currently disposes of snow in compliance with MS4 regulations.

Appendix E – Stormwater Management for UMMS Projects

DID YOU KNOW?

Stormwater Management for UMMS Projects

University of Massachusetts UMASS Medical School

UMMS has adopted new stormwater management requirements for new development/redevelopment projects to meet the NPDES Municipal Separate Storm Sewer System (MS4) permit.

Review criteria below to determine if your project is subject to these requirements and if so, how to meet them.

Is your project exempt?

Projects that are exclusively limited to maintenance and improvement of existing roadways are exempt from the MS4 Permit's more stringent water quality requirements discussed below but **must improve existing conditions unless infeasible.**

EXEMPTIONS

Roadway projects included in this exemption: widening less than a single lane, adding shoulders, correcting substandard intersections, improving existing drainage systems, and repaving projects

Does your project disturb one or more acres of land?

» Continue to design in accordance with MA Stormwater Handbook, but also meet the MS4 Permit's more stringent water quality requirements for new development and redevelopment projects.

» Incorporate low impact development site planning and design strategies, unless infeasible.

» If your project is located upstream of a phosphorus impaired waterbody (i.e., any project located on main campus in Worcester, MassBiologics in Mattapan, or the Maple Ave satellite campus in Shrewsbury) optimize design of structural best management practices (BMPs) to treat phosphorus.

Optimize your design for phosphorus removal

» Minimize impervious surfaces where possible to reduce the need for structural BMPs.

» Prioritize infiltration systems where site conditions allow.

» Design structural BMPs to treat the first flush (1/2 to 1 inch) of runoff from all impervious surfaces on the site. Small BMPs distributed throughout the site are often more effective at reducing nutrient loading than large BMPs that treat greater runoff depths from only a portion of the impervious surfaces.

DID YOU KNOW?

Stormwater Management for UMMS Projects

Is your project defined as new development under the MS4 permit?

NEW DEVELOPMENT

Any construction activities or land alteration resulting in total earth disturbances greater than 1 acre (or activities that are part of a larger common plan of development disturbing greater than 1 acre) on an area that has not previously been developed to include impervious cover.

- Design BMPs to provide treatment for the site's total post-construction impervious area. Treatment must provide an average annual pollutant removal equivalent to 90% of the average annual load of Total Suspended Solids (TSS) and 60% of the average annual load of Total Phosphorus (TP).
- Achieve that pollutant removal through one of the following methods:

1. Design/install BMPs that together meet site TSS and TP pollutant removal requirements based on the guidance in the MS4 Permit; or
2. Retain the volume of runoff equivalent to, or greater than, one (1.0) inch multiplied by the total post-construction impervious surface area on the new development site; or
3. Provide a combination of retention and treatment; or
4. Utilize offsite mitigation that meets the above standards within the same USGS HUC12 as your site.

Is your project defined as redevelopment under the MS4 permit?

REDEVELOPMENT

Any construction, land alteration, or improvement of impervious surfaces resulting in total earth disturbances greater than 1 acre (or activities that are part of a larger common plan of development disturbing greater than 1 acre) that does not meet the definition of new development.

- Design BMPs to provide treatment for the site's total post-construction impervious area. Treatment must provide an average annual pollutant removal equivalent to 80% of the average annual load of TSS and 50% of the average annual load of TP.
- Achieve that pollutant removal through one of the following methods:

1. Design/install BMPs that together meet site TSS and TP pollutant removal requirements based on the guidance in the MS4 Permit; or
2. Retain the volume of runoff equivalent to, or greater than, 0.8 inches multiplied by the total post-construction impervious surface area on the redevelopment site; or
3. Provide a combination of retention and treatment; or
4. Utilize offsite mitigation that meets the above standards within the same USGS HUC12 as your site.

Stormwater Management for UMMS Projects

Provide documentation to UMMS

» Pollutant calculations in accordance with the MS4 Permit:
   - TSS and TP loading for the overall project site and to each BMP.
   - TSS and TP removal for the overall project site and to each BMP (both percent reduction and annual load reduction in lb/yr) calculated for the post-construction impervious area using the BMP storage volume and pollutant removal curves (i.e., percentages) consistent with MS4 permit guidance.

» As-built drawings depicting all BMPs, both structural and non-structural, designed to manage the stormwater associated with the completed site.

SITE
The extent of construction activities, including but not limited to the creation of new impervious cover and improvement of existing impervious cover.

References

Massachusetts Small MS4 General Permit
https://www.epa.gov/npdes-permits/massachusetts-small-ms4-general-permit

BMP Pollutant Removal Tools and Information
https://www.epa.gov/npdes-permits/stormwater-tools-new-england#swbmp

Appendix F – Construction Site Runoff Control for UMMS Projects

DID YOU KNOW?

Construction Site Runoff Control for UMMS Projects

UMMS has erosion and sediment control requirements for projects under construction to meet the NPDES Municipal Separate Storm Sewer System (MS4) Permit. Review criteria below to determine if your project is subject to these requirements, and if so, how to meet them.

UMMS MS4 CONSTRUCTION SITE RUNOFF CONTROL POLICY

For all projects disturbing one or more acres, UMMS requires the use of sediment and erosion control practices at construction sites. UMMS requires proper control and disposal of construction related wastes and prohibits the discharge of such wastes to UMMS' stormwater drainage system.

If your project disturbs one or more acres, you must ensure site erosion and sediment control is performed in accordance with this policy and the procedures discussed below.

This policy is in addition to EPA's stormwater Construction General Permit (CGP) program. While this policy does not create additional requirements for the contractor beyond obtaining and complying with EPA's stormwater CGP, UMMS will be performing reviews and inspections as required to report compliance annually to EPA on this provision of UMMS' MS4 permit.

UMMS MS4 Construction Site Runoff Control Program

The purpose of UMMS' MS4 Construction Site Runoff Control Program is to minimize or eliminate erosion and maintain sediment on site so that sediment is not transported in stormwater to downstream receiving waterbodies.

UMMS ensures construction site stormwater management through compliance with the EPA's stormwater CGP. UMMS includes a bid item and special provisions on construction contracts which exceed the one-acre land disturbance threshold. The bid item and special provisions require preparation of a Stormwater Pollution Prevention Plan (SWPPP) by the contractor in accordance with EPA's stormwater CGP.

The SWPPP is a dynamic document that will be updated continually by the operators throughout construction. Generally, the SWPPP will outline and detail the required erosion and sediment controls and best practices for pollution prevention. Additional documentation included in the SWPPP includes:

- ✓ Contact information for responsible parties, the stormwater team, personnel responsible for inspections, and personnel responsible for completing corrective actions;
- ✓ Details regarding Project site information, receiving waters, any impairments or Total Maximum Daily Loads (TMDLs) associated with receiving waters;
- ✓ Project description and site maps;

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Construction Site Runoff Control for UMMS Projects

- ✓ Construction activities sequencing and logging;
- ✓ Allowable non-stormwater discharges;
- ✓ Documentation of inspection schedule, corrective action directives, and processes for amending the SWPPP;
- ✓ Details about required training for the stormwater team, inspectors, and operators;
- ✓ Discussion of the required erosion and sediment controls (including natural buffers, perimeter controls, sediment track-out, controls for stockpiled sediment or soil, minimizing dust, minimizing disturbance of steep slopes, topsoil controls, soil compaction, storm drain inlet protection, constructed stormwater conveyance channels, sediment basins, chemical treatment, site stabilization, and dewatering practices);
- ✓ Best practices for pollution prevention (including identifying potential sources of pollution, fueling and maintenance of equipment or vehicles, washing of equipment and vehicles, storage handling and disposal of construction products materials and wastes, washing of applicators and containers used for paint concrete or other materials, fertilizers, pavement sweeping, and spill prevention and response); and
- ✓ Compliance with other regulations including endangered species, historic preservation, and the Safe Drinking Water Act.

Site Plan Reviews

UMMS performs internal reviews of project design to ensure projects include appropriate erosion and sediment control practices, consider potential water quality impacts, and evaluate Low Impact Development (LID) in site planning and design strategies. UMMS reviews construction SWPPPs for all projects before construction begins to ensure adequate best management practices (BMPs) are planned for both during and after the construction phase of the project.

Site Inspections and Enforcement Procedures

UMMS requires contractors to perform site inspections in accordance with EPA's stormwater CGP requirements. In addition, UMMS' Resident Engineer will perform inspections of erosion and sediment controls on construction projects.

Erosion and sediment control measures must be installed in accordance with the SWPPP before any land disturbance begins for the Project and must remain in place for the duration of the Project. For permanent BMPs, UMMS' requires inspections to occur both during and after construction to ensure BMPs are functioning as designed.

UMMS prohibits the discharge of demolition debris, such as discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes to UMMS' stormwater drainage system. These wastes must be controlled on-site until they can be properly disposed of in accordance with the project's SWPPP.

DID YOU KNOW?

Construction Site Runoff Control for UMMS Projects

Sediment & Erosion Control Measures

UMMS expects the following types of sediment and erosion control measures to be included in SWPPPs for UMMS construction projects.

Minimize disturbance of steep slopes

Minimize

- **Minimize the amount of disturbed area.** Use construction phasing when possible to limit the area of exposed soil at a given time.
- **Minimize disturbance of steep slopes and stabilize slopes that do require disturbance.** Slope stabilization measures should be designed to disperse the erosive energy of flow and rainfall. Examples include straw mulch and seeding, erosion control stone, and erosion control blankets.

Protect storm drain inlets

Protect

- **Protect natural resources.** Use natural buffers when possible between disturbed areas and adjacent natural resources, such as wetlands and streams.
- **Protect all storm drain inlets and install appropriate inlet protection measures** prior to any land disturbance. Examples of inlet protection include concrete block and stone barriers (when vehicle traffic is not an issue) or at-grade, proprietary inlet protection devices, such as catch basin inserts. Depending on site and rainfall conditions, inlet protection measures often require more frequent inspection and cleaning/replacement.

Install a construction access pad

Minimize dust

Stabilize

- **Stabilize construction site entrances and exits.** Construction access pads are one of the most important erosion control measures for preventing sediment and mud from being tracked offsite on to paved surfaces. Use a construction access pad that is at least 6 inches thick and ensure the pad slopes away from the existing roadway.
- **Minimize dust.** Depending on site and rainfall conditions, use measures such as water trucks to minimize dust and prevent sediment from being blown off site.
- **Use perimeter controls to retain and capture sediment.** Examples include silt fence barriers, sediment filter socks and other geotextile barriers. Perimeter controls should be regularly inspected and periodically replaced on longer duration construction projects.
- **Stabilize sites** when projects are complete, or operations have temporarily ceased. Include proper removal of erosion and sediment control measures as part of site clean-up (e.g., remove perimeter controls and inlet protection, such as catch basin inserts).

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