

RULES AND SPECIFICATIONS

For Excavation Activity Within The City Of Boston

April 6, 2015



**BOSTON
CONDIT**

1630

**City of Boston
PUBLIC WORKS DEPARTMENT**



PRELUDE

Public Utility Companies and Private Contractors who open and occupy the public way throughout the City of Boston must act responsibly responding to the residents, local businesses, and travelers who depend upon the use of these public ways in the course of their daily lives. Improper backfilling, poor patching, careless plating, unsightly debris remaining from completed projects and excavations into newly resurfaced streets portray to the public an image of indifference and wasteful spending.

As the municipal agency responsible for the maintenance and safety of the public right-of-way in the City of Boston it is the duty of the Public Works Department to protect the interests of the public we serve. The Boston Public Works Department sets forth the following Rules and Specifications as a mandatory requirement for the issuance of a Public Works Department permit to open or occupy a public way.

TABLE OF CONTENTS
RULES AND SPECIFICATIONS FOR STREET OPENINGS

SECTION 1.00 INTENT AND PURPOSE

SEC. 1.01 INTENT AND PURPOSE 4

SECTION 2.00 DEFINITIONS

SEC. 2.01 DEFINITIONS 5-9

SECTION 3.00 PERMIT REQUIREMENTS

SEC. 3.01 ACTIVITIES REQUIRING PERMIT 10
 SEC. 3.02 BOND REQUIREMENTS 10
 SEC. 3.03 INDEMNIFICATION 10
 SEC. 3.04 PENALTY 10
 SEC. 3.05 FEES 10-11
 SEC. 3.06 SIDEWALK DEPOSIT REQUIREMENT 11
 SEC. 3.07 BILLING PROCEDURES 11
 SEC. 3.08 SELECTION OF UTILITY INFRASTRUCTURE LOCATION 11-12
 SEC. 3.09 BPWD PERMIT APPLICATION 12-13
 SEC. 3.10 TRAFFIC MANAGEMENT PLAN 14
 SEC. 3.11 NIGHTS AND WEEKEND WORK 14
 SEC. 3.12 EMERGENCY PERMITS 14-15
 SEC. 3.13 NEIGHBORHOOD PERMITS 15-16

SECTION 4.00 PROJECT COORDINATION

SEC. 4.01 GENERAL 17
 SEC. 4.02 CONSTRUCTION COORDINATION ON THE PUBLIC RIGHT OF WAY 17
 SEC. 4.03 CLEARANCE PROCESS 17-18

SECTION 5.00 WORK ZONE SETUP PROCEDURES

SEC. 5.01 SAFETY 19-21
 SEC. 5.02 PROTECTION OF MUNICIPAL STORM DRAIN AND SEWER SYSTEMS 21

SECTION 6.00 EXCAVATION PROCEDURES

SEC. 6.01 GENERAL 22
 SEC. 6.02 LEAFLETING AND POSTING PROCEDURES 22-23
 SEC. 6.03 EXCAVATION REQUIREMENTS 23-25

SECTION 7.00 PROTOCOL FOR WHEN EXCAVATION EXPOSES OR DAMAGES STREET LIGHTING, BTB, OR ELECTRICAL CONDUIT

SEC. 7.01 DAMAGED OR EXPOSED STREET LIGHT CONDUIT PROTOCOL 26
 SEC. 7.02 DAMAGED OR EXPOSED BTB TRAFFIC CONDUIT PROTOCOL 26-27
 SEC. 7.03 DAMAGED OR EXPOSED ELECTRICAL CONDUIT PROTOCOL 27
 SEC. 7.04 REPRECUSIONS FOR NOT FOLLOWING PROTOCOL 27

SECTION 8.00 SECURING OPEN EXCAVATIONS

SEC. 8.01 GENERAL 28
 SEC. 8.02 STEEL PLATING 28-29
 SEC. 8.03 BARRIERS AND FENCING 29

SECTION 9.00 BACKFILL REQUIREMENTS

SEC. 9.01 BACKFILL MATERIAL 30-32
 SEC. 9.02 PLACEMENT OF BACKFILL/BASE MATERIAL 32-33
 SEC. 9.03 AFFECTED SUB-BASE BY UTILITY INFRASTRUCTURE 33

<u>SECTION 10.00 TEMPORARY PATCHING OF ROADWAY OPENINGS</u>	
SEC. 10.01 GENERAL	34
SEC. 10.02 MATERIALS.....	34
SEC. 10.03 METHODOLOGY.....	35
SEC. 10.04 GUARANTEED STREET PATCHING	35-36
SEC. 10.05 UTILITY REPAIR TAGS.....	36
SEC. 10.06 LOOP DETECTORS AND PAVEMENT MARKINGS	37-38
<u>SECTION 11.00 CASTINGS AND SUBSTRUCTURES</u>	
SEC. 11.01 GENERAL	39
SEC. 11.02 CASTING REPLACEMENT AND INSTALLATION.....	39-40
<u>SECTION 12.00 RESTORATION OF SIDEWALKS</u>	
SEC. 12.01 GENERAL	41
SEC. 12.02 MATERIALS: CONCRETE MIX DESIGN AND SPECIFICATIONS	42
SEC. 12.03 METHODOLOGY: TEMPORARY PATCHING OF SIDEWALK OPENINGS	43
SEC. 12.04 METHODOLOGY: PERMANENT RESTORATION OF SIDEWALK PATCHES	43-46
SEC. 12.05 MATERIALS: BRICK SIDEWALKS.....	46
SEC. 12.06 EDGESTONE.....	46
SEC. 12.07 METHODOLOGY: BRICK SIDEWALK RESTORATION.....	46-50
SEC. 12.08 SPECIAL CONDITIONS	50
<u>SECTION 13.00 WINTER MORATORIUM</u>	51-55
<u>SECTION 14.00 QUALITY ASSURANCE PROTOCOL</u>	
SEC. 14.01 CIU INSPECTIONS.....	56
SEC. 14.02 UNACCEPTABLE PATCH AND TRENCH REPAIR REQUIREMENTS	57-58
SEC. 14.03 PERMITTEE REPORT CARD	59
SEC. 14.04 PERMITTEE WORKSITE SHUTDOWN AND MEETING PROTOCOL.....	59-60
SEC. 14.05 CONSITUENT RELATIONSHIP MANAGEMENT WORK ORDER SYSTEM.....	60-61
<u>SIGNATURE PAGE</u>	62
<u>APPENDICES</u>	
APPENDIX A: MODIFIED WINTER PATCHING MATERIAL	63-66
APPENDIX B: PLATE NOTIFICATION FORM	67
APPENDIX C: FOREMAN'S CHECK LIST	68-69
APPENDIX D: BACKFILL AND PAVEMENT CROSS SECTION	70
APPENDIX E: BWSC – ADJUST CASTING DETAIL NO. B-15	71
APPENDIX F: MASS HIGHWAY CONSTRUCTION AND TRAFFIC STANDARD DETAIL - PEDESTRIAN RAMPS	72-82
APPENDIX G: STEEL PLATES AHEAD CAUTION SIGN.....	83
APPENDIX H: UNEVEN SURFACE AHEAD CAUTION SIGN.....	84
APPENDIX I: JACKIE'S LAW	85-86
APPENDIX J: PERMANENT PAVEMENT RESTORATION OF STREETS	87-89
<u>ACKNOWLEDGEMENTS PAGE</u>	90

SECTION 1.00

INTENT AND PURPOSE

Sec. 1.01 Intent and Purpose

- A. The public right-of-way in the City of Boston is a fixed limited resource with a statutory obligation that needs to be managed to maximize the preservation of essential services to the inhabitants of the City of Boston, Massachusetts. These Rules and Specifications, specifically Section 9, Chapter 21 of the Revised Ordinances of 1961 or the latest revision thereof (Chapter 5, Ordinance 11, Paragraph 158) Title II of 1975, supplement the General Ordinances of the City of Boston, Governing Roadways and right-of-way within the city limits.
- B. These Rules and Specifications have been enacted by the Boston Public Works Department (BPWD) to regulate the use of public right-of-ways in the interest of public safety and convenience, and to operate and protect the BPWD infrastructure. Excavation and restoration standards are required to preserve the integrity, operational safety, and function of the public right-of-way.
- C. The Public Works Department in the City of Boston is granted the authority to administer and enforce the requirements of these Rules and Specifications. BPWD personnel shall have the right to require such actions as necessary to enforce adherence and compliance to these Rules and Specifications. Note that most excavations into the right-of-way occur within municipal streets; however, references to "streets" in these Rules shall be applicable to all street right-of-ways.
- D. These Rules and Specifications are intended to provide a mechanism to assure that all excavation activities are performed consistently. All work not referenced herein pertaining to street excavations and repairs are required to be in compliance with MassDOT Standards.
- E. **The BPWD reserves the right to waive, alter or update these Rules and Specifications as needed in order to ensure that the interests of the City of Boston are being sufficiently met.**

SECTION 2.00

DEFINITIONS

Sec. 2.01 Definitions

For the purpose of understanding the Rules and Specifications, all words shall have their standard meanings. These words are more particularly defined as follows:

AAB shall be defined as the Architectural Access Board, a regulatory agency within the Massachusetts Office of Public Safety. Its legislative mandate states that it shall develop and enforce regulations designed to make public buildings accessible to, as well as functional and safe for use by persons with disabilities.

ADA shall be defined as the Americans with Disabilities Act and all the requirements set forth therein.

Arterial Street shall be defined as a primary street that may be functionally classified under the Federal-Aid Classification System (Fed-Aid) or National Highway System (NHS), as facilitating the movement of the highest traffic volumes in the City of Boston. Major and Minor Arterial streets are a sub-classification to better define the estimated traffic use of the facility.

Backfill shall mean the placement of specified material in all spaces excavated and not occupied by substructures, and the bedding up to the elevation of the bottom of the pavement structure, or other surface material.

Boston Public Works Department (BPWD) shall mean the City of Boston, and/or its Public Works Department, or its designated agent.

Bonded Contractor shall mean the person(s) or utilities that have met the insurance requirement of all applying Permittees before the issuance of any Permit. Bond forms are on file at the BPWD Permit Branch Office.

Boston Transportation Department (BTD) shall mean the City of Boston's Department responsible for the safe passage of vehicular, bicycle, and pedestrian traffic through the public ways in the City of Boston, traffic rules, restrictions, regulations, signals, appurtenances, and street signage within the public right of way.

Castings or Cast Iron Infrastructure shall refer to manholes, valve casings, access covers, culverts, or catch basins, and shall be defined as any structure installed to grade of a roadway or sidewalk designed to allow for access to underground conduit or other infrastructure.

COBUCS shall mean the City of Boston's Utility Coordination Software tool developed by the City of Boston to effectively manage the construction within the City of Boston, eliminating potential conflicts through the sharing of information over a secure server. **All Permittee's are required to utilize the COBUCS tool in order to obtain a City of Boston PWD Permit.**

CIU shall mean the BPWD Construction Inspection Unit. This unit is responsible for enforcing these Rules and Specifications.

CMD shall mean the Construction Management Division of the BPWD. The CMD is responsible for the establishment and coordination of PWD capital programs and the enforcement of these Rules and Specifications.

Collector Street shall mean a secondary classification facility to the arterial in which the next heaviest traffic volume streets may be classified under the Fed-Aid or NHS system. Collector streets serve as feeder routes from residential streets to arterial streets or travel between arterial streets.

Compaction shall mean the act of firmly packing together construction material to ensure stability of substructures, bedding materials, backfill/base gravels, and surface materials.

Constituent Relationship Management (CRM) – The City of Boston's Work Order Management system that allows constituents to engage with the City and request basic city services such as pothole repairs, resurfacing requests, sidewalk restorations, contractor complaints, casting repairs, etc. via mail, phone, email, and web portal. Constituents are able to check the status of their requests and are updated via email as actions are taken regarding their requests.

Dig Safe shall mean the current existing underground facility damage prevention system established by Massachusetts State statute, the American Public Works Association, and the Utilities Location and Coordination Council to provide for safe underground excavation.

Distortion shall mean localized pavement surface areas having elevations lower or higher than those of the surrounding pavement.

Driveway shall mean the area used to provide vehicular access, parking, and/or storage from the private property to the curb, or to the improved or traveled section of street. It is the portion of a street from the private property line to the curb, including the curbing and/or lack thereof, to the improved or traveled section of street.

Emergency shall mean any event which may threaten public health or safety, including but not limited to: damaged or leaking water or gas conduit systems; damaged, plugged or leaking sewer or storm drain conduit systems; damaged underground electrical and communications facilities; or downed overhead pole structures. Emergency permits are only valid for a 24-hour period, unless otherwise specified.

Encroach shall mean:

1. The placing, depositing, or parking of any ladder, staging, scaffolding, rigging, tower, fence, wall, material, equipment, machinery, dumpster, container, refuse, debris or any other such object, article or thing used in connection with, or arising out of, any building, construction, reconstruction, remodeling, repair, excavation, demolition or other like work. Encroach shall also include the placing, depositing, or parking of any trailer, truck or like vehicle adjacent to or in close proximity to aforementioned work, and which is being so used for such purposes.
2. An intrusion or use caused by the draining or pumping of water in any manner which may in any way obstruct, impede, or endanger public use or travel, or could cause any icy condition which in any way may obstruct, impede or endanger public use or travel or the City of Boston drainage system.
3. The placing of any booth, stall, stand, display, goods or merchandise for sale, vending machine, billboard, sign, advertising instrument or apparatus, or any other such object, article or thing.
4. The placing or erecting of any shed building, tower, pole, pole line, pipe, wall, fence or any other such structure or object.

Excavation shall mean any action of digging up, drilling, auguring, tunneling, milling, reclaiming, or cable and pipe driving. Excavation does not involve the tilling of soil, gardening, or displacement of earth, rock or other material for agricultural purposes, nor the installation or maintenance of signs performed by the BPWD or the MASSDOT. This term includes the establishment, construction, resurfacing, repaving or reconstruction of any sidewalk and/or driveway approach, or the placing of any substructure.

Facility shall mean any pipe, pipeline, tube, main, service, trap, vent, vault, manhole, meter, gauge, regulator, valve, conduit, wire tower, antenna or ancillary equipment, pole, pole line, anchor, cable, pay phone, junction box, or any other material, structure, or object of any kind or character, whether enumerated herein or not, which is or may be lawfully constructed, left, placed or maintained in, upon, along, across, under, or over any public place.

Guaranteed Street shall mean any constructed, reconstructed or rehabilitated roadway that has been constructed or rehabilitated within the past **five (5) years**.

High Concern Areas shall mean any location being worked on that interrupts a crosswalk, sidewalk, bike lane, bus lane, major intersection, or is located on or at the bottom of a steep decline, or any other location designated by the City.

Jackie's Law shall refer to the Commonwealth of Massachusetts General Law Title XIV: Chapter 82A Excavation and Trench Safety. See Appendix F.

Licensed Contractor shall mean the Permittee is currently a qualified, licensed and bonded Contractor in the State of Massachusetts.

Major Excavation shall mean placement, repair or replacement of any main utility line; placement, repair, or replacement of the majority of utility service lines on any street; any excavation project of a minimum one-hundred

(100) feet in length or a four-hundred (400) square foot area; or any project complex enough to be deemed “major” by BPWD.

MassDOT shall mean the Massachusetts Department of Transportation.

Modified Winter Patching Material shall mean a mixture of modified asphalt binder material and mineral aggregates used to temporarily repair winter excavations, which shall meet the technical specifications in Appendix A.

New Street See *Guaranteed Street*

Obstruction shall mean an adverse impact resulting from right-of-way disruptions or encroachments to the right-of-way on the citizens of the City of Boston or others requiring altered travel routes and time. See *Encroach*.

Patch shall mean an area normally excavated to accommodate a substructure, its appropriate bedding material, backfill, and subsequent pavement structure. A patch area is less than four-hundred (400) square feet.

Paved Area shall mean any area with a paved surface consisting of material such as: Hot-Mixed Asphalt, concrete, brick, cobblestone, or granite pavers. These areas are typically referred to as streets, driveways, alleys, sidewalks, footways, walkways or steps.

Pavement Structure shall mean a paved area founded on approved backfill material comprising of a surface course and intermediate course of Hot-Mixed Asphalt (HMA) material, Portland cement concrete, or block/brick materials founded on a dense, granular, or other approved base material. BPWD defines the interface between the bottom of the Pavement Structure and the top of the backfill material to reside at twelve (12) inches below the bottom of the Hot-Mixed Asphalt material.

Pedestrian Ramp shall mean a curb cut area that acts as a transition from the roadway to a sidewalk for ease of access to the sidewalk from the roadway for the use of pedestrian traffic. The City of Boston’s “Pedestrian Ramp” and the Massachusetts Highway “Wheelchair Ramp” shall have the same denotation. Pedestrian ramps must adhere to AAB standards, and are held to the specifications as outlined by Appendix F. All slopes, level landings, wings and structures adjacent to the ramp are considered as part of the pedestrian ramp. Driveways are not considered a pedestrian ramp.

Permanent Pavement Restoration shall mean the restoration of pavement disturbed by excavation activity to a condition that meets or exceeds the BPWD’s Rules and Specifications, and can reasonably be expected to remain in good condition for at least the remainder of the street's existing pavement life before rehabilitation.

Permittee shall mean any person who has obtained a permit as required by BPWD and these Rules & Specifications.

Person shall mean any individual, firm, company, association, corporation, trust or government authority, partnership, public or private corporation, authority or utility, trust, estate, governmental entity, agency or political subdivision of the BPWD, the State of Massachusetts, the United States, or any other legal entity, or their legal representative, agent, or assign excluding the BPWD. Any gender specific term or phrase includes all genders, and the singular tense shall include the plural where indicated by the context.

Pole Placement shall mean an excavation associated solely with a single placement or replacement of a utility pole.

Private Utilities shall mean any utilities installed within the public way for the exclusive use of the abutters (i.e. telecommunication conduit, steam lines, oil lines, etc.).

Private Way shall mean a way specified by the local public authorities for the accommodation of individuals, and wholly or chiefly at their expense but not restricted to their exclusive use, and subject to the public easement of passage.

Public ground is any ground, land or premises leased, maintained, or in the possession or control of the City of Boston.

Public place shall mean any public street, way, place, alley, sidewalk, park, square, plaza, or any other similar public property owned or controlled by the City of Boston, and dedicated to public use.

Public Right-of-Way shall mean the area on, below, or above present streets and sidewalks, alleys, avenues, roads, boulevards, curbs, gutters, shoulders, or public easements, or any parking lot maintained by or in the possession or control of the City of Boston, or other public lands including easements dedicated for City of Boston use, or the assignment of use in parcels by the City of Boston, but not including the airwaves above.

Public Safety Issue is any act, situation, or circumstance that endangers the life or safety of the citizenry, and/or actions that result in the severe damage or disruption of municipal property.

Public Utility shall mean any public service company incorporated under the provisions of the General Statutes or by Special Act for the purpose of transmitting or distributing gas, water, electricity, telephone, cable television or telecommunications.

Recycled Gravel shall mean a blended gravel material that has been tested by a professional Engineer certifying that the gravel adheres to MassDOT M1.03.1 standard and has been approved by the City of Boston. Recycled gravel material may not be used as a backfill material unless otherwise authorized by the BPWD. Recycled Gravel is more specifically defined in Section 9.01(C).

Re-used Gravel shall mean any material removed from an excavated jobsite that, after being tested by a Professional Engineer certifying that the gravel adheres to MASSDOT M1.03.1 standard and has been approved by the City of Boston. Re-used gravel material may not be used as a backfill material unless otherwise authorized by the BPWD.

Rehabilitation shall mean the activity of work on any street that provides structural improvement having a minimum service life of 15 years with minor maintenance, which includes pavement overlay of (1½") one-and-one-half inches minimum depth, mill/overlay of (1½") one-and-one-half inches minimum of HMA, reclamation followed by HMA placement, and partial or full-depth reconstruction.

Residential Street shall mean all City of Boston streets not classified as Arterial or Collector per Federal-Aid or NHS classification systems.

Rideability shall mean the effect of street pavement conditions on vehicular traffic. Acceptable rideability is typically achieved from pavement surfaces that are smooth, dense, and uniform. Pavement restorations that do not exhibit failed conditions, detailed in Section 14.02, shall typically be considered to have acceptable rideability. A patch should perform over time equal to that of the adjacent permanent pavement within the same street.

Security shall mean a bond or cash deposit submitted to the BPWD to assure timely and proper completion of required work.

Sidewalk shall mean any public area within a City of Boston right-of-way (including driveways) that is available to pedestrian traffic.

Sidewalk Areaway shall be defined as the subdivision of a privately owned building structure that extends into the public way, often utilized as storage space by the building owners. All repairs to the sidewalk, which serves as the roof to these areaways, are the sole responsibility of the property owner.

Sidewalk Flag (Concrete) shall be defined as the area of concrete extending from the edgestone to the property line confined within perpendicular score lines to the roadway. All score lines parallel to the roadway are considered as part of the sidewalk flag.

Skid Resistant Plate shall be defined as any steel plate where a skid-resistant surface equal to or greater than the adjacent existing roadway or sidewalk surface has been added to the decking of the plate.

Specialty Sidewalk shall mean any sidewalk built using materials other than those approved for common use by the City. Specialty sidewalks are the responsibility of the property owner for maintenance and repair as outlined in the License agreement held with the Public Improvement Commission, a division of the BPWD.

Street shall mean any public or private area (generally paved) within a City of Boston right-of-way that is available to vehicular traffic.

Substructure shall mean any pipe, conduit, duct, tunnel, manhole, vault, buried cable, wire, utility system appurtenance, or any other similar structures located below the surface of any public place.

Temporary Pavement Repair shall mean the replacement of excavated pavement in accordance with the City of Boston pavement specifications outlined in Section 10.00, utilizing three (3) inches of MassDOT Type I Top or MassDOT 9.5mm Superpave Hot-Mixed Asphalt.

Travel Way shall mean the entire portion of a street between curb lines intended for motor vehicle use, or if there is not a curb line the improved or traveled section of a street, including shoulders, intended for motor vehicle use.

Trench shall mean an area normally excavated to accommodate a substructure, its appropriate bedding material, backfill, and subsequent pavement structure. A trench area is greater than or equal to four-hundred (400) square feet.

Utility shall mean any corporation, City, or other governmental subdivision, partnership, organization, or any individual or persons engaged within the Commonwealth in any business that is in any respect made subject to the supervision or regulation by the Department of Telecommunications and Energy. For the purposes of these Rules and Specifications, a Utility shall also mean any person or entity engaged by, or on behalf of, a Utility to perform street opening work.

Utility Coordinator is a BWPD employee acting as the representative to the Commissioner of the Boston Public Works Department, facilitating coordination between the City of Boston and the utility companies and quasi-public agencies (i.e. Boston Water & Sewer Commission, Massachusetts Bay Transit Authority, Boston Redevelopment Authority, etc.) operating within city limits. The Utility Coordinator shall resolve conflicting utility works, and defer such work to be done later as priority dictates. It is the responsibility of the Utility Coordinator to hold monthly meetings with all major utility companies, state agencies, and fellow City departments that excavate into the public way. This process is done in order to make each agency aware of the City's proposed schedule so as to avoid conflicting work being performed in the same period and to prioritize said schedules by the utilities and other agencies with the City in an attempt to eliminate conflict. The Utility Coordinator shall also be responsible for the overseeing of COBUCS and affiliated systems.

Utility Repair Tag shall mean a circular, colorized UV-stable pavement marker comprised of durable material of one piece construction with at least three barbed legs extending from its lower surface measuring not less than 1.5" in diameter and not greater than 2", containing the Permittee's customer ID number located at the top of the marker, year the patch was performed located in the center of the marker, and where applicable the unique contractor or utility identifier approved by the City of Boston Public Works Department. Utility Repair Tags are imbedded at zero grade tolerance, or slightly below, during the final phase of paving procedures on all permitted asphalt patches.

Winter Moratorium shall mean the restrictive delay period from November 15th through April 15th.

SECTION 3.00

PERMIT REQUIREMENTS

Sec. 3.01 Activities Requiring Permit

Work typically requiring a permit shall include, but shall not be limited to the installation of utilities, driveways, curbing, or sidewalks; excavation or filling for grading purposes; encroachment in a street or public property; obstruction of a street or drain, or any other modification which could either damage BPWD's infrastructure, or conflict with existing or planned utility infrastructure locations.

Sec. 3.02 Bond Requirements

Before any person, utility, corporation, or company is granted a permit to occupy or excavate a public way in Boston they must first submit a bond in an amount determined by the Commissioner of Public Works. Bond forms and information regarding the bond process is available in the BPWD permit branch.

A person making application for a trench excavation permit shall produce a certificate of insurance with general liability coverage of \$1,000,000 per each occurrence, and \$2,000,000 in general aggregate.

Sec. 3.03 Indemnification

The Permittee agrees, as a condition governing the issuance of a permit, that they shall hold harmless the City of Boston, the Commissioner of Public Works and his agents and employees from any and all claims and actions whatsoever arising from the execution of said permit.

Sec. 3.04 Penalty

Any permit issued by the BPWD is revocable immediately upon written notification to the Permittee. Any person, firm, or corporation who violates any of the regulations of this manual shall be guilty of a misdemeanor, and upon conviction thereof shall be fined not less than \$300.00. A violation shall be issued for each day a worksite remains in violation and is subject to a fine of not less than \$300.00 for each issued offense. If the work or any part thereof mentioned in the permit is unskillfully or improperly done, the BPWD shall make any necessary repairs and shall keep an account of the expense thereof. The Permittee responsible for said work shall pay the BPWD an amount equal to the whole of said expense incurred by the BPWD.

Thereafter, upon completion of the work and the determination of the costs thereof, the City shall issue no further permits to any person or utility until it receives payment of said costs.

Any person or utility that continues to violate any regulation of this manual shall receive no future permits until such a time as the BPWD is satisfied that the person or utility shall comply with the terms of these Rules and Specifications.

Sec. 3.05 Fees

The BPWD shall levy charges and fees as determined by the City of Boston.

The permanent pavement restoration fee shall be assessed based upon the entire area requiring permanent repair work.

Permanent repairs for openings covered by any permit shall be paid for on the basis of rates established by the Commissioner of Public Works in accordance with the provisions of Section 9, Chapter 21, of the Revised Ordinances of 1961 or the latest revision thereof, and Chapter 5, Ordinance 11, Paragraph 158, Title II of 1975.

The cost of all incidental items such as Tack Coat Emulsion, crack seal, lane markings, towing, police details, etc. utilized in the making of repairs is the sole responsibility of the Permittee.

The BPWD has established a list of streets **Resurfaced or Reconstructed** within the preceding **Five (5) years**, (Guaranteed Street List).

- A. For trenches, or a series of small consecutive cuts, Permittees shall be responsible for curb-to-curb cold-planing, resurfacing, and all applicable items necessary to repair no less than the length of the trench, or patches, and no greater than the original construction.
- B. For all other patches the limits of repair for the work shall be no less than the length of the patch including an additional twenty-five (25) feet beyond either extremity of excavation work, and no greater than the original City resurfacing or reconstruction limits, unless otherwise stipulated within these Rules and Specifications.

The BPWD shall not seek any additional services or fees outside those justified to protect the current and remaining life of the affected public right-of-ways.

Sec. 3.06 Sidewalk Deposit Requirement

Any activities with potential to damage a public sidewalk or pedestrian access ramp will be required to provide the Permit Office with a Sidewalk Deposit equal to the estimated replacement value of the affected area. Sidewalk Deposits will be returned by petition after an inspection by the City determines that all damaged areas have been replaced, all new sidewalks and pedestrian ramps meet City standards and ADA/AAB requirements, and all permit requirements have been met.

Sec. 3.07 Billing Procedures

The PWD Permit Office will charge fees to each Permittee based upon the excavation dimensions they provide during the permit application process.

Permittee's will be responsible for tracking and verifying final measurements of the actual size of each excavation patch performed. Permittees must submit their final measurements to the PWD Permit Office within 90 days of the expiration of their permit.

A City engineer, or qualified representative, will measure and record the final dimensions of resulting work performed by the Permittee to verify the Permittee's measurements. A signed copy of the measurements will be submitted to each company; the original sign off will be kept by the city for official records.

The Permittee will be billed or credited for the discrepancies in estimated and final measurements on all work in excess or deficiency of the estimated quantity of work reported at the time of the permit application.

The BPWD will permanently restore all temporary utility excavation patches to the full depth and specifications of the existing roadway.

Sec. 3.08 Selection of Utility Infrastructure Location

- A. The BPWD shall specify for each street classification the approximate locations within the right-of-way for each type of utility. The utility may determine that an alternate location is preferable. In such cases the utility shall submit written application to the BPWD describing the reason for relocating the utility. If the BPWD finds good cause for the alternate location, the BPWD may allow the utility to locate or relocate its infrastructure to a location other than that specified by the Rules and Specifications.
- B. In deciding if there is good cause to alter the typical location of the utility infrastructure, the BPWD shall consider the following factors:
 - 1. Public safety
 - 2. Accessibility to the utility infrastructure
 - 3. Pavement disturbance reduction benefits both current and future, if any
 - 4. Future use impacts
 - 5. Adequacy of location documentation
 - 6. Space constraints for other utilities

- C. When making an application to alter the typical location of a utility infrastructure, the applicant must certify with written documents that it has consulted with, and received approval from, all other existing and potential utilities in the proposed location. The BPWD shall give reasonable deference to an objection made by any utility on the basis of protection and maintenance of its existing infrastructure.
- D. The BPWD shall reserve the right to require public improvements in cases where it allows a utility to locate its infrastructure in non-standard locations. The BPWD shall consider the Utilities fiscal policies guiding infrastructure expansion decisions when determining the level of required public improvements. The cost of this requirement shall not exceed seventy-five (75) percent of the standard legal location cost.

Sec. 3.09 BPWD Permit Application and Work Requirements

- A. The Public Works Permit Branch will deny issuance of PWD permits to locations that have not been entered into the COBUCS system, as outlined in Section 4.00.
- B. No permit shall be issued, unless a current application form provided by the BPWD has been completed, submitted to, and approved by the BPWD. All Applications require at least five (5) business days for approval. The written application shall include a minimum of the following:
 - 1. Name, address, and telephone number of the (a) applicant (note: For all major excavation projects the applicant shall be required to provide a viable means of contact, accessible twenty-four (24) hours a day); (b) person for whom the work or activity is being done; and (c) owner of the private premises affected. If the applicant is not the person doing the actual excavation or encroachment work, the applicant must give to the BPWD in writing, at least three full working days prior to the starting of any such work, the name, address and telephone number of the person responsible for said work.
 - 2. Date when the request was made.
 - 3. Name and location by nearest street address, number, or proximity to intersecting street, of the public place to be excavated.
 - 4. Beginning and ending date of proposed work, including anticipated date of any and all paving restoration.
 - 5. Purpose, scope, and limits of work to be done, including a diagram showing the location of the work or encroachment in relation to the outstanding features of the street such as property lines, pavement lines, sidewalks, curbs, trees, intersecting roads, drainage facilities, traffic control appurtenances, and utility poles by number. Depending upon the type, complexity, and extent of the intended excavation or encroachment, one or more sets of complete plans and related documents may be required to facilitate the determination of the exact locations of the various parts of the work, the risk of injury to street users, and the effect upon private property, trees, shrubs, and street structures. These documents are to be approved by the BPWD.
 - 6. Diagram of location, size, and number of paved area cutouts anticipated.
 - 7. Verification that the applicant is currently a qualified, licensed, bonded excavator in Boston, Massachusetts.
 - 8. Insurance Certificate for all persons and vehicles used to execute said Permit issued.
 - 9. Three (3) references, preferably from municipalities, are required for all new Contractors.
 - 10. Signature of Permit applicant.
 - 11. Appropriate fees and Security based upon the reasonable cost of administering the Rules and Specifications enacted by the City of Boston shall be established by the Commissioner and confirmed by the Street Opening Clerk.
- C. The issuance of a permit does not excuse compliance with, or duties and responsibilities under, any other applicable regulation, ordinance or law and specifically requires compliance with the General Statutes as amended. An approved "Dig Safe" authorization number shall be maintained.

- D. The issuance of a permit in no way obligates the BPWD to issue, continue, or extend any permitted work; relocate the facilities of others encountered during the initial installation; or any other responsibility.
- E. In the event that work, encroachment, or repairs not designated in the original permit must be performed in the same location, the Permittee shall make an application to the BPWD for a permit authorizing such additional work, encroachment or repairs.
- F. Any person making, causing or maintaining any excavation or encroachment has the responsibility and obligation to determine whether or not all or any part of such excavation or encroachment traverses a city roadway, and determine from the BPWD whether or not any such excavation or encroachment requires a permit under these Rules and Specifications.
- G. Contractor must forewarn all impacted abutters, providing them with a phone number and the name of a contact person to answer any questions.
- H. Permittees performing excavation work that falls under the criteria of Jackie's Law will be required to apply for a separate permit from the BPWD permit branch regarding the qualifications of the excavator operator(s) digging trenches in the City's public way. The Inspectional Services Department (ISD) requires a separate permit for work performed on private property. The Jackie's Law permit will be in addition to the BPWD street opening permit, and the BTD approval form. The approved "Jackie's Law" permit shall be posted in plain view on the site of the trench.
- I. Annual gravel testing and lab-certification of current maximum dry density, and corresponding moisture content (ASTM D 1557) of granular material has been performed and submitted to PWD for approval, as specified in Section 9.01(E).
- J. During the Winter Moratorium all permit applications must obtain approval by the BPWD Winter Moratorium Board prior to submitting a BTD Traffic Management Plan.
1. The Winter Moratorium Board meets twice a week to review permit applications between November 15th and April 15th in room 714, City Hall.
 - All major utility companies must meet with the Winter Moratorium Board on Wednesdays, between 9:00am until 12:00pm.
 - All private contractors must meet with the Winter Moratorium Board on Thursdays between 9:00am until 12:00pm.
- K. Application forms shall be available from, and submittals shall be given to, the Permit Branch at the Boston Public Works Department (BPWD).
- L. All BTD Rules Regulations and Permit requirements shall be adhered to.
- M. The Permittee must call 617-635-4950 to notify the BPWD Construction Inspection Unit (CIU) 24 hours in advance of each of the following activities listed below:
1. Work starting
 2. Backfilling
 3. Paving Operations
 4. Completion of work
- Failure to notify the BPWD CIU may result in project shut down and subsequent police enforcement, unless otherwise approved by BPWD.
- N. **All repairs must fully comply with ADA and AAB standards.** Any repairs found to be in violation of ADA or AAB standards become the sole responsibility of the Permittee.
- O. The Permittee is required to **maintain a compliant, temporary pedestrian passageway including signage around the construction** area according to ADA and AAB standards. The Permittee must maintain safe, unobstructed vehicular traffic throughout construction.

Sec 3.10 Traffic Management Plan

All applicants requesting permits for excavations are required to meet with the BTM to discuss the scope of work and necessary conditions prior to issuance of a permit. Focusing on public safety, the meeting shall cover acceptable traffic and parking impacts, street surface conditions, and the convenience of travel as it pertains to the excavation of the project. To guarantee all regulations are being adhered, the City may assign a full time inspector to the project. The applicant will also be required to submit for approval plans and specifications, which include a traffic control plan certified by a registered Professional Engineer in the State of Massachusetts, prior to the issuance of a permit. The applicant shall provide an "as built plan" showing location and grades of all utilities affected by this permit. An 'as built plan' must be prepared by a licensed Land Surveyor, and submitted to the BPWD before the installation of the backfill, pavement foundation, and hot mix asphalt. No utility work shall be backfilled until the BPWD has inspected and approved the work.

- A. The BTM Traffic Management Plan must be at the work site at all times during active construction.
- B. **All entities working within the City of Boston must arrange to allow access for planned street cleaning, trash and recycling collection. All construction must be coordinated to avoid conflict with these activities. Information on sanitation and street sweeping schedules can be found on the [Public Works](#) web page or call the Sanitation Office at (617) 635-7573.**
- C. On all projects, Permittees must leaflet the affected area at least seventy-two (72) hours in advance of work in accordance to Section 6.02.
- D. The BTM requires all Permittees to post "No Standing" signs forty-eight (48) hours in advance of work in accordance to Section 6.02.

Sec. 3.11 Nights and Weekend Work

All permit requests for work that will occur during nights or weekends must be approved by the BPWD Construction Management Division and the BTM prior to the permit application.

- A. After submitting a project into COBUCS and discussing the BTM Traffic Management Plan in the Transportation Department, if the BTM determines that the work will take place on nights or weekends that Permittee must meet with the Construction Management Division to schedule CIU inspection.
- B. The CIU inspection team may require mandatory inspection for night and weekend work during backfill and paving procedures.
- C. Hot boxes will be required unless otherwise authorized for all night and weekend work. This will ensure that the proper job mix formulas can be obtained and the asphalt temperatures will be placed as required, as specified in Section 10.02.

Sec. 3.12 Emergency Permits

Utility companies are permitted to purchase a series of emergency permits to be activated in case of emergency allowing for crews to occupy and excavate on the public right-of-way to perform critical repairs of their infrastructure.

Emergencies must be worked on continuously until the repairs are complete and the disturbed pavement restored to grade level with hot mix asphalt. If repairs cannot be completed within a 24-hour period, the Permittee is required to follow the standard non-emergency permitting process for authorization to occupy and/or excavate the public way. Leaving a job site after correcting an emergency situation without closing the excavation creates an unwarranted safety hazard and will not be tolerated.

If a Permittee fails to convert an emergency permit to a standard non-emergency permit after the twenty-four hour permit period has expired, **no new permits** will be issued until a standard non-emergency permit for that location is obtained.

Activation of a new emergency permit on an existing emergency repair permit location where the Permittee has previously vacated the work zone will be considered an abuse of the non-emergency permit policy. The job will be shut down until a non-emergency permit is issued.

If it is determined by the BPWD that a Permittee is misusing emergency permits the job will be shut down and a meeting shall be scheduled with the Permittee's highest level of management, the Commissioners of Public Works and Transportation, and a Representative from the Mayor's Office.

The following rules shall apply when an emergency opening is required:

- A. When an emergency is declared by a Permittee the BPWD must be notified by calling the CMD at 617-635-4950 with the following information:
 1. Exact job location
 2. Nature of emergency
 3. Contact phone number
- B. Within one hour of activating an emergency permit the utility company is mandated to notify the Public Works and Transportation Departments citing the location and reason for the emergency. In addition to this information the BPWD will require the Mass Hoisting License # also be included on the emergency notification to the City. Within 24 hours the City will expect the standard Jackie's Law Permit application to be filled out and filed with BPWD in the Permit Branch.
- C. Emergency cards must be submitted to the BPWD Permit Office within 7 days of activating an emergency permit.**
- D. Failure to comply with the rules for emergency excavation shall be in violation of existing City Ordinance – Excavation without Permit.
- E. The City reserves the right to require utility companies to email designated City personal periodic updates regarding emergency work.**

Sec. 3.13 Neighborhood Permits

- A. The BPWD Permit Office will issue neighborhood-wide excavation permits for the following utility companies in order to expedite repairs to cast iron infrastructure and unacceptable patch locations, as well as for permanent sidewalk restoration work.
 - Boston Water & Sewer Commission
 - Comcast Cable Communications, Inc.
 - Massachusetts Bay Transit Authority
 - National Grid
 - NSTAR Electric
 - NSTAR Gas
 - Veolia Energy Co.
 - Verizon
- B. Utility companies must apply for a separate neighborhood-wide permit for each repair type. Neighborhood-wide permits may be obtained for the following districts:
 - Allston/Brighton
 - Charlestown
 - North Dorchester
 - South Dorchester/Mattapan
 - East Boston
 - Fenway/Mission Hill
 - Hyde Park
 - Jamaica Plain
 - Roxbury

- South Boston
- South End/Back Bay
 - Roadway and sidewalk work on main arterials will still require individual permit applications in this neighborhood.
 - The BTD and BPWD must be notified 48 hours in advance of any work taking place within the South End/Back Bay neighborhood to coordinate around planned Special Events.
- West Roxbury/Roslindale

The neighborhoods of Bay Village, North End, Beacon Hill, Chinatown, and the Downtown area will all require individual permit applications for work. The BTD may allow neighborhood permits on non-main arterials of the above listed neighborhoods pending review and approval by BTD.

- C. Permits may be obtained at the beginning of the Construction Season and are valid from April 15th until November 15th unless otherwise authorized by the BPWD and BTD.
- D. The BPWD CMD must be notified at least 24 hours in advance of all cast iron structure repairs, unacceptable patch repairs, and permanent sidewalk restorations performed as indicated on the permit.

SECTION 4.00

PROJECT COORDINATION

Sec. 4.01 General

Prior to the issuance of excavation permits in the City of Boston, all entities must submit their proposed work into the City of Boston Utility Coordination Software (COBUCS), to aid in the utility coordination process.

All entities are required to remotely log into and access the database via a web connection and submit planned programs for approval by the Construction Management Division.

COBUCS can be accessed at <https://pwdapps.cityofboston.gov/cobucs/>.

All proposed BPWD plans to construct, reconstruct, rehabilitate, or resurface a public right-of-way are submitted into the COBUCS program for utility review and coordination.

To request a COBUCS account for your company, please contact the CMD at 617-635-4950.

Instructions on how to access and use the COBUCS program are available at http://www.cityofboston.gov/images_documents/cobucs%20user%20guide_tcm3-25790.pdf.

Excavation into Guaranteed Streets will incur additional cost for restoration at the expense of the Permittee. The current Guaranteed Street List showing newly constructed, reconstructed, rehabilitated, and resurfaced streets is available for all COBUCS users, or at the Permit Branch located in Boston City Hall.

Sec. 4.02 Construction Coordination on the Public Right-of-Way

The City requires that all companies that utilize the COBUCS program submit a two (2) year or long-term projected capital program where possible. The BPWD allows submittal up to five (5) years in advance or longer for major construction. All Permittees are required to submit their proposed excavation work locations into COBUCS the day they become aware of the potential work.

The City of Boston mandates that all private contractors and site plan engineers submit their plans into the COBUCS program for conflict review and coordination.

All private contractors and site plan engineers are required to review the City's Capital Project plans to verify they have no conflicting projects currently scheduled on any streets listed for resurfacing or reconstruction.

In order for the City to effectively coordinate potential projects that may take place within an active or planned resurfacing or reconstruction candidate, the City requests that all potential projects to be entered into COBUCS regardless if they have been funded or not. Projects later cancelled should be deleted from the COBUCS program.

All Permittees who receive a conflict with their COBUCS submission must contact the CMD via email the same day they are aware of the conflict. This will allow the necessary coordination to take place.

Sec. 4.03 Clearance Process

The Construction Management Division inputs all proposed resurfacing, reconstruction, and sidewalk programs into the COBUCS system for utility review and clearance prior to scheduling construction.

Utility and telecommunication companies, and other municipal and state agencies, are required to review all City submitted projects for official review and clearance or deferral through their COBUCS account.

Clearance

- A. Locations cleared in the COBUCS program by an entity are expected to have been investigated of material and age and found to be highly reliable, showing little to no signs of failure and/or frequent emergencies. The City considers the **clearing** of a street as a **sign off** and assumes no frequent maintenance work will be required for the following BPWD repair activities and time frame:
1. Resurfacing **5 years minimum**
 2. Reconstruction (Full Depth 4" Minimum) **10 years minimum**
 3. Conflicting minor projects, such as service repairs and maintenance, or projects that can be performed early in the Construction Season, must be submitted to the CMD for clearance by the City.
- B. Coordinated projects identified as conflicts to City Capital Programs able to be performed during the construction season are to be completed within the following timeframe from the date of notification:
1. Repairs to Existing Facilities 30 days maximum
 2. Service Connections 60 days maximum
- C. When a street has been cleared by all entities, reviewed by all contractors and site plan engineers, and has been programmed for resurfacing or reconstruction, the BPWD shall provide written notice to all property owners who may be affected by the City's Capital Program. Upon receipt of such written notice, such person or utility shall have sixty (60) days in which to request service installations, upgrades, or repairs within the specified locations.

Deferral

- A. The BPWD requires notification in writing outlining the amount of time required to complete any utility project proposed on a City of Boston programmed street, along with a detailed explanation as to why an extension should be granted. No extension granted by the BPWD shall exceed one year from the original date of notification. Thereafter the BPWD shall have the right to **deny permit applications** for excavations not specifically contained within each utility's respective planned work programs, with the exception of emergency work.
1. Major projects, such as main relays and capital improvement programs that are projected to extend beyond a year, are NOT to be cleared in the COBUCS program. Your company is to contact the CMD immediately indicating what project you will be performing, how long it will take, and the limits of the work.
- B. Locations identified as conflicts to BPWD roadway repair programs, but will not allow paving to take place within the Construction year, are to be completed within the following timeframe from time of notification:
1. New Installations 1 year maximum

The BPWD expects the utility to provide the age, pipe size, material type and history of maintenance repairs when requested by BPWD.

- C. All private and public utilities, agencies, or parties excavating streets in the City of Boston right-of-way are required to attend monthly Utility Coordination meetings through its Utility Coordinator, or representative, held at City Hall to discuss and coordinate current/future excavations.

SECTION 5.00

WORK ZONE SETUP PROCEDURES

Sec. 5.01 Safety

All work shall be performed in accordance with the BPWD Rules and Specifications, or in a manner as prescribed by the BPWD for circumstances not covered by the Rules and Specifications. All work must be conducted in strict accordance with the latest Regulations of OSHA.

- A. Provisions shall be made for the safety and protection of pedestrian and vehicular traffic during the construction period.
- B. The Permittee shall be responsible to furnish and erect all required signs and traffic safety devices.
- C. BTD "No Standing" signs must be posted at least 48 hours prior to start of work, as specified in Section 6.02.
- D. Cones and non-reflecting warning devices shall not be left in operation on the roadway when daytime operations have ceased, unless otherwise directed by the BPWD/BTD. If it becomes necessary for the BPWD/BTD to remove any construction-warning device, or the appurtenances from the project due to negligence by the Permittee, all cost for this work shall be charged to the Permittee.
- E. Flashing arrow boards shall be used as directed when operations occupy the roadway, and shall be available for use at all times.
- F. All signs, barricades, and other traffic safety devices shall conform to the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD), unless otherwise directed by the BPWD/BTD.
- G. Both the BPWD and BTD will require that all locations where active excavation is taking place be secured with solid barricades to properly protect the excavation site. The City may require barricaded locations be specifically designed for the sight impaired. Barricades must be submitted to the BPWD and BTD for approval prior to use.

The use of cones and barrels with tape or rope will not be considered adequate alone for delineating the active excavation site. Cones, barrels, tape and rope will be allowed for delineating the traffic lanes or excavation areas not actively being work on.

Any work adjacent to the curb must be taped or roped off along the sidewalk. The Permittee may use existing poles or other appurtenances to supplement its cones or other barricades when protecting pedestrians from the work zone. Depending on the location, the City will require the Permittee to install solid, continuous barricades only. The City may require barricaded locations be specifically designed for the sight impaired.

On major excavations where a Permittee will be working in a large portion of the street, both sides of the sidewalk must be closed to pedestrian access by use of barricades, tape or rope. Depending on the location, the City will require the Permittee to install solid, continuous barricades only. The City may require barricaded locations be specifically designed for the sight impaired.

- H. If the sidewalk is to be closed at any time the Permittee must provide two (2) MUTCD R9-10 "Sidewalk Closed – Use Other Side" signs on either side of the site **at the nearest intersecting street corners**. Depending on the location, approaching streets may require additional sidewalk closed signs.
- I. Efforts shall be made to maintain normal traffic flow. Interruptions or obstructions to traffic shall be defined by conditions of the Permit.
- J. The Permittee is required to provide two (2) white Plasticade® sign board stands at the beginning and end of each work zone. One (1) signboard may be used on one-way streets. Each stand must contain a white reflective sign on both the front and back at least thirty-six (36) inches in height by twenty-four (24) inches in width with black lettering at least six (6) inches in height. Each sign shall clearly identify the Permittee's name followed by the word "Worksite", primary phone number, and website address if available. See the BPWD Permit Branch for detailed lettering layout specifications.

- K. All Permittees shall conduct and carry out excavation work in such a manner as to avoid unnecessary inconvenience and annoyance to the general public and occupants of the neighboring property. The Permittees shall take appropriate measures to reduce any noise, dust, or unsightly debris to the fullest extent possible between the hours of 7:00 a.m. and 6:00 p.m. The Permittee shall not use, except with the express written permission of the BPWD or in case of an emergency as herein otherwise provided, any tool, appliance, or equipment producing noise of sufficient volume to disturb the sleep of the neighboring property.
- L. When in the opinion of the BPWD/BTD the work constitutes a hazard to pedestrians and/or vehicular traffic in any area, the Permittee may be required to suspend operations during certain hours, and is obligated to remove any equipment from the roadway.
- M. Whenever excavation work will require a trench to be left one and a half (1.5) inches below grade for greater than forty-eight (48) hours while pending paving operations the Permittee is required to post signs alerting the public that the trench has been left down low on purpose, and that the location is an active work zone.
 1. Approved sign design and specifications for the signs to be used are available at the BTD.
 2. Signs must be professionally bolted to existing poles above all existing signage already in place.
 3. Signs must be firmly secured and are expected to remain in place 24/7 for the entire duration of the project.
 4. The signs must be posted between one hundred (100) to two hundred (200) feet prior to the beginning of the low trench area.
 5. Place at least one sign for each direction leading to the work zone where the trench is low awaiting final paving.
 6. Depending on the scope of your work and the location the CIU reserves the right to request more signs be used.
- N. The roadway surface shall be kept clean of debris at all times, and shall be thoroughly cleaned and swept upon the completion of any work at the end of every shift.
- O. Blasting, if necessary, shall be done in accordance with state law and local ordinance.
- P. The Permittee shall supply copies of all log data and analyses collected from groundwater monitoring wells as required by state law and local ordinance.
- Q. MassDOT Standards for Line Clearance shall conform to the National Electric Safety Code Standard Clearance for Highway Crossings.
- R. The Permittee shall be required to take all necessary precautions to protect private property from damage and to prevent unnecessary inconvenience to residents in the City of Boston by providing a safe means of access to private and commercial property throughout the duration of any construction project
- S. When a snow or ice condition exists during the progress of work, the Permittee shall maintain a safe work zone for the vehicles and pedestrians. The BPWD/BTD may restrict or suspend all construction activities during snow, sleet, or ice storms and subsequent snow removal operations.
- T. **All Permittees are required to be able to mobilize and be on site to protect their work zone within one (1) hour of being made aware of a public safety issue associated to their work.**

A work crew should begin making all necessary repairs to provide a safe work zone within 3 hours of notification.

- U. At the end of each day the street opening shall be secured by a steel plate, hot mix asphalt, or modified cold patch as outlined in Section 8.01. **No opening shall be left in gravel.**

The BPWD may make exception to the plate requirement upon special circumstance as determined by the Boston Transportation Department.

- V. When securing an open excavation Permittees must abide by all Jackie's Law restrictions, as specified in Appendix G.

W. All Permittees must attempt to remove their Dig Safe markings upon completion of their work. The City reserves the right to require power-washing at any time.

1. Guaranteed Street cuts and sidewalks will require mandatory power-washing of Dig Safe markings or other paint marks unless otherwise authorized.

Sec. 5.02 Protection of Municipal Storm Drain and Sewer Systems

- A. The Permittee shall protect all storm drain and sewer appurtenances located adjacent to and within the construction site. The protection measures used shall be designed to prevent the discharge of pollutants into any portion of the storm drain and/or sewer system.
- B. The Permittee shall be responsible for the removal of all construction debris, dirt, trash, rock, sediment, sand or other pollutants that may accumulate in the storm drain or sewer conveyance systems as a result of construction activities associated with a permit.
- C. No person shall cause the impediment of storm water flow in the flow line of the curb and gutter.
- D. The Permittee shall prevent sediment, debris, and all other pollutants from entering the storm water and sewer systems during all phases of construction.
- E. The cleaning of cement truck delivery chutes is prohibited at the job site, unless confined in a predefined, bermed containment area. The discharge of water containing waste cement to the storm drain or sewer systems is prohibited.
- F. The Permittee shall protect all storm drains and sewer facilities adjacent to any location where pavement cutting operations involving motorized wheel cutting, saw cutting, or abrasive water jet cutting are to take place. The Permittee shall remove and properly dispose of all waste products generated by said cutting operations on a daily basis. The discharge of any water contaminated by waste products from cutting operations to the storm sewer system is prohibited.
- G. The discharge to the storm drains and sewer systems of water used for flushing off paved surfaces is prohibited, unless measures have been taken to remove pollutants from the discharge.
- H. The use of rebar, steel stakes, or steel fence posts to stake down straw or hay bales, or to support silt fencing used as a sediment control measure, is prohibited.

SECTION 6.00

EXCAVATION PROCEDURES

Sec. 6.01 General

- A. Any person or utility having obtained a street or sidewalk opening permit shall be fully responsible for restoring streets, sidewalks, walkways, driveways and their appurtenances (i.e. granite curb, underdrain, filter fabric, sewer and drainage structures, median strips, signage pavement markings, traffic signal loops, pedestrian ramps, etc.) in complete compliance with the BPWD's Rules and Specifications.
- B. Restorations must be monitored and maintained by the affecting entity for **not less than (3) three years**. Photographs may be taken prior to the start of work to insure the restoration of designated areas meets or exceeds pre-construction conditions. Copies of the photographs must be delivered to the BPWD.
- C. All sidewalk, specialty sidewalk, walkway, driveway, esplanade, and lawn areas shall be **permanently restored by the Permittee**, and shall be done in compliance with the applicable BPWD Rules and Specifications standards, unless otherwise directed by the BPWD.
- D. The Permittee is required to furnish all materials and shall be responsible for the job to be executed in an orderly, timely, quality-controlled manner utilizing proper workmanship and construction techniques conducted in accordance with industry standards for the successful completion of the work, backfilling, appurtenant restorations, and pavement repair.
- E. The Permittee shall keep a competent foreman overseeing sufficient competent employees to perform the work with all proper speed in accordance with the requirements of the law, other public authorities, and to the reasonable satisfaction of the BPWD.
- F. The Permittee shall conduct the work in such a manner as not to unreasonably interfere with other work being done by the BPWD, by contract or otherwise. As deemed necessary by the BPWD, the work done under these specifications shall conform to the progress of said other work. The Permittee shall cooperate with the contractors or employees who may be doing work for the BPWD, and with public service corporations affected by the work, in arranging for storage places, temporary support for structures, repairs, etc.
- G. All entities working within the City of Boston must arrange to allow access for planned street cleaning, trash and recycling collection. All construction must be coordinated to avoid conflict with these activities. Information on sanitation and street sweeping schedules can be found on the [Public Works](#) web page or call the Sanitation Office at (617) 635-7573.
- H. All traffic control signs (i.e. Stop, Yield, Do Not Enter, One Way, No Parking, Speed Limit, Street Cleaning, etc.) approved by the BTM for removal, relocation, replacement, etc. must be immediately replaced by the Permittee in accordance to MUTCD and BTM specification, unless otherwise directed by the BTM. No such traffic control sign shall be removed, relocated or replaced without approval from the BTM.

Sec. 6.02 Leafleting and Posting Procedures

- A. As per BTM requirements, all Permittees must leaflet streets affected by their planned major construction projects a minimum of 72 hours before the start of any setup or excavation procedures.
- B. The BTM requires all Permittees to post "No Standing" signs 48 hours in advance of all construction work in the public right-of-way. Signs must contain the following details:
 - Permittee name
 - Contractor name, if applicable
 - BTM hours of operation
 - Dates of work
 - Permit number
 - Work limits and address range
 - Emergency 24 hour contact information

The BPWD will supply a template with the aforementioned details to be attached to the BTD No Standing signs for Permittees with major projects estimated to take longer than one week to complete.

Signs must be firmly attached to poles or posts, clearly visible to all vehicular and pedestrian traffic. Crews must remove signs after work is completed.

- C. On major projects crews may not post areas where they will not be working within the next forty-eight (48) hours, unless otherwise authorized by the City.
- D. Permittees may not prohibit parking on days they know they will not be working, and must remove or update signs accordingly. When unexpected delays occur preventing a crew from going to a posted work site the Permittee must make every effort to update the dates on the sign as soon as possible within the same business day.
- E. On major projects utility companies must leaflet the street and email the Public Works, BTB, and ONS a minimum of two weeks prior to start of the project. Leaflets must include:
 - Scope of Work
 - Contractor
 - Estimated Limits and Duration of Work
 - Contact Number(s)

ONS may determine that a Neighborhood meeting may be warranted before the project can begin.

Sec. 6.03 Excavation Requirements

- A. Cutting Roadway:
 - 1. The maximum permissible length of open trench at any time shall be one-hundred-fifty (150) feet, and no greater length shall be opened for pavement removal, excavation, construction, backfilling, repairing or any other operation without written permission of the BPWD/BTD.
 - 2. Initial excavations into paved street surfaces shall be pre-cut in a neat line to the full depth of the existing pavement using one of the following methods: motorized wheel cutting, saw cutting, cold-planing, or pneumatic chiseling.
 - a. Whether accomplished by saw cutting, milling, pavement breaker or other mechanical means the pavement shall be removed such that all surfaces are neat and free of loose materials to affect a tight seal with any new pavement.
 - 3. Heavy-duty pavement breakers are prohibited when the use endangers existing substructures or other property.
 - 4. The shape of pavement cutouts shall be rectangular. All irregular shaped cuts or damaged pavement shall be repaired at the expense of the Permittee.
 - 5. Pavement edges shall be trimmed to a neat vertical face, free of loose materials and neatly aligned with the centerline of the trench.
 - 6. Pavement shall be removed over undermined areas and over-breaks, and the sub-grade shall be treated as the main trench.
 - 7. Tunneling, boring, or other methods may be required by the BPWD. When a Permittee installs a utility service to a customer an opening may be made over the common supply line to make the proper connection.

B. Cutting Sidewalk:

1. All cuts on concrete sidewalks shall be made from the nearest joint or score line on one side of the excavation to the nearest joint or score line on the other side of the excavation.
2. Saw cutting of Portland unreinforced cement concrete is required. The depth of the cut must be the full depth of the pavement and concrete, unless otherwise directed by the BPWD. Saw cutting may be required by the BPWD outside of the limits of the excavation over undermines, over-breaks, or small floating sections.
3. All cuts on brick sidewalks shall be made by neatly squaring all edges of the excavation to the nearest line of full size bricks. All bricks in the way of excavation shall be neatly removed by the Permittee prior to any other work being performed and safely stored either by the Permittee or delivered to the BPWD District Yard garage for that neighborhood. Restoration of brick sidewalks must be performed in accordance of Section 12.06.
4. All cuts on asphalt sidewalks shall be made by neatly squaring all edges to form a rectangular shape at a 90° (degree) angle.
5. Driveway excavation shall incorporate the full width of the driveway opening and extend from the gutter line on the street to the street right-of way. If the driveway opening is greater than, or equal to, (20') twenty feet in width from cornerstone to cornerstone the BPWD may approve a reduction in excavated area.
6. At the time of permit application the applicant shall be required to pay a restoration cost for all paving blocks, cobblestones, or bricks expected to be removed as a result of excavations within the right of way, unless these materials are required to be replaced, or are delivered in good condition to a BPWD District Yard for storage.

C. Excavation:

1. Excavated material shall be removed from the jobsite and disposed of in such a manner that shall minimize interference and obstruction of pedestrian and vehicular traffic.
2. Any site where the excavation is in excess of three (3) feet below grade and the depth of which is, in general, greater than the width, but the width of the trench, as measured at the bottom, is no greater than 15 feet will be subject to "Jackie's Law" and all regulations therein, as specified in Appendix G.
3. Street Openings deeper than five (5) feet shall require shoring and bracing, adhering to the Occupational Safety and Health Act (OSHA). This includes where unsafe conditions are created due to composition of the soil, climatic conditions or construction operations.
4. Temporary or permanent sheeting, shoring or bracing may be used to support the sidewalls of the trench, preventing the undermining of the full depth of twelve (12) inches, stable shelf of undisturbed street base and the existing adjacent pavement. This installation shall be required to maintain the safety of personnel and traffic. Steel sheeting, shoring, or bracing shall be driven or placed for all depths over five (5) feet.
5. Ledge must be cleared from utility trenches prior to backfill so as to provide a gravel cushion of at least six (6) inches below and on both sides of the utility being installed.
6. Under no circumstances shall an open excavation be left unattended overnight, unless properly barricaded and approved by the BPWD and the BTB.

D. Geofabric Material: If an excavation cuts through an area that has been constructed with Geofabrics, the following restoration procedures shall be strictly followed:

1. A fabric replacement piece that has similar properties as that of the damaged fabric must be used. The most important property is that of the O_{95} Sieve Test, which has an opening allowing five (5) percent of the glass beads to pass through when sieved (ASTM D4751-87).
2. The trench walls must be cut a minimum of four (4) inches in the area of Geofabric replacement with every precaution taken so as not to disturb the exposed fabric. A minimum of a four (4) inch overlap of new fabric is required. Soil migration in this seam area shall not be allowed. The seam width shall increase if the sub-grade is determined to be very soft. If a soft sub-grade exists and the trench lies directly beneath a wheel-path, the seam width shall increase to twelve (12) inches.
3. Seams shall be sewn or stapled in accordance with manufacturer's recommendation. If sewn, the Permittee shall use colored thread, shall not sew near the edge of the fabric, shall not double sew at ten (10) to fifteen (15) stitches per inch, and shall use thread material that closely matches fabric properties. If stapled or pinned, the Permittee shall pin on two (2) foot (0.6m) centers and use six (6) inch by one (1) inch wide staples which can be applied by a foot activated gun.
4. Caution shall be exercised when placing and compacting the first twelve (12) inches of material so as to not damage the Geofabric material.

E. Under-drain

1. If an excavation cuts through an existing under-drain system it shall be repaired by the Permittee, in accordance with the BPWD's Rules and Specifications or as directed by BPWD, at no additional cost to the City of Boston.
2. The BPWD reserves the right to require a Permittee to install an under-drain within any major excavation zone if the BPWD determines the existing conditions warrant the use of under-drains.

SECTION 7.00

PROTOCOL FOR WHEN EXCAVATION EXPOSES OR DAMAGES STREET LIGHTING, BTM, OR ELECTRICAL CONDUIT

Sec. 7.01 Damaged or Exposed Street Light Conduit Protocol

- A. Any contractor who strikes or damages a street lighting conduit must immediately contact the Street Lighting Section.
- Monday - Friday, 7:00am until 12:00am (midnight) please call **617-635-7501**.
 - Monday - Friday, 12:00am (midnight) until 7:00am, and weekends and holidays, please call **617-635-4500**.
1. Permittees must not close the excavation until an inspector has reviewed the conduit. An inspector will be sent to the site to identify the line that was damaged.
 2. All damage shall be repaired by the Permittee. The contractor hired to repair the City's street lighting conduit needs to have experience in electrical conduit work. All costs shall be the responsibility of the Permittee.
 3. Once the repairs have been made the Permittee must notify Street Lighting at **617-635-7501** to prevent an unnecessary continuance of the street light outage. A lack of notification will be considered as an indication that repairs have not been completed.
 4. The conduit must be inspected by the Street Lighting Section prior to backfilling at no cost to the City of Boston.
- B. Any damage that is discovered by the Street Lighting section after the Permittee has left the location shall be the responsibility of that Permittee for repair.
1. If repairs must be made by the Street Lighting Section a bill will be issued to the appropriate Permittee responsible for the damage for all work necessary for the repair and/or replacement of conduit and cables. No new permits will be issued to that Permittee until the bill is paid.
 2. The City will thoroughly investigate any incident of stray voltage and if a Permittee is responsible for the stray voltage they will be held liable for any and all damage (property as well as personal) sustained.
- C. Any electrical infrastructure that is struck or damaged that directly affects street lighting conduit(s) must be reported to both NSTAR Electric and the Street Lighting Section.

Sec. 7.02 Damaged or Exposed BTM Traffic Conduit Protocol

- A. Any Permittee who strikes or damages BTM Traffic Signal Conduit must immediately contact the Boston Transportation Department at:
- Monday - Friday, 6:00am until 10:00pm please call **617-635-4430**.
 - Saturdays, 9:00am until 5:00pm please call **617-635-4430**.
 - Monday - Friday, 10:00pm until 6:00am, weekends except Saturdays 9:00am until 5:00pm, and holidays, please call **617-635-4500**.
- B. The excavation must not be closed until a BTM inspector has assessed the situation and determined which line/conduit was exposed and the extent of any possible damage.

- C. Damage that has not been reported to the BTD, or has been discovered by BTD after the Permittee has left the location, shall be the responsibility of that Permittee to repair.
- D. Damage to BTD conduit and/or cables must be repaired by a BTD approved traffic signal contractor. All work must comply with BTD specifications.
- E. Any damage that is discovered by the BTD after the Permittee has left the location shall be the responsibility of that Permittee for repair.
- F. Any utility infrastructure that is struck or damaged that directly affects BTD conduit(s) (i.e. Damage to NSTAR electric conduits feeding traffic signal cabinets) must be reported to both NSTAR Electric and the BTD.
- G. All Permittees must contact BTD to request plans showing the approximate location of BTD owned conduits before performing any excavation near or at a signalized intersection.

Sec. 7.03 Damaged or Exposed Electrical Conduit Protocol

- A. When a Permittee damages an electrical conduit they are required to notify NSTAR Electric at **1-800-592-2000** immediately.
- B. The Permittee must keep the excavation open and remain on scene until NSTAR Electric responds on site.

When a Permittee exposes or damages electrical conduit they may inadvertently affect street lighting or traffic conduit as well, which could result in our street lights or traffic signals being inoperable.

Sec. 7.04 Repercussions for Not Following Protocol

- A. Any Permittee who damages a Street Lighting or Transportation conduit and refuses to make the necessary repairs resulting in the City restoring the conduit, that Permittee will not be allowed to receive a new permit until the associated costs for the repairs have been paid for.
- B. **Any Permittee who strikes or damages a BTD conduit and does not follow BPWD protocol will have that job shut down with the possibility of all active work suspended and new permit requests put on hold.**

SECTION 8.00

SECURING OPEN EXCAVATIONS

Sec. 8.01 General

No street opening shall be left in gravel. All excavations and trenches shall be safely secured before the cessation of BTM approved work hours each day of active construction utilizing steel plates, hot mix asphalt, or temporary cold patch to prevent the spread of dust and debris from inclement weather and/or traffic. These requirements shall be applied to all emergency openings. Temporary cold patch must be replaced with hot mix asphalt within 48 hours.

Steel plates shall be used to secure open excavations only when the Permittee is unable to backfill the same day excavation occurs. The Permittee must obtain approval to use steel plates to secure their work site by the BPWD no later than 12:00pm during the normal work week. Two-way traffic must be maintained at all times, unless otherwise authorized by BTM.

Sec. 8.02 Steel Plating

Approval of steel plates will only be given for active work sites where crews are scheduled to return the next business day. Any work site that will remain idle for over twenty-four (24) hours must be backfilled and paved to grade, unless otherwise authorized by the BPWD. In the event steel plates must be left unattended for over twenty-four (24) hours without prior approval, the Permittee is required to notify the CIU the reason(s) and necessity of the plate(s), as well as the estimated time before resuming their work.

It is the responsibility of the Permittee to perform a **daily monitor** of all active plates or unattended plate locations, and where necessary take appropriate measures to protect the public safety until work commences.

If any plate left unattended by the Permittee shifts or moves, thereby exposing part of or all the excavation and creating a public safety issue, the Permittee will be cited in violation of "Jackie's Law", as well as in violation of the PWD Rules and Specifications.

- A. All plated locations must have "Caution: Steel Plates Ahead" signs constructed with **Retro Reflective Florescent Orange material (Type 4)** bracketed 6 feet in height or greater on unobstructed poles or posts, unless otherwise approved by the BPWD.

Signs must be posted 200-300 feet in advance of steel roadway plates being used, or as otherwise directed by the PWD.

If plates span across the centerline of a two way street a sign must be placed on both sides of the street approaching the steel plates. Depending on the location, including approaching streets, the City may require the posting of more signs.

- B. Steel Plate Ahead signs must be taken down when plates have been removed from the work site.
- C. Steel plates shall be of sufficient thickness to resist bending, vibration, loud banging etc. under traffic loads. All steel plates must be securely anchored to prevent movement.
- D. All steel plates must meet ASTM A 36 steel (minimum), having a thickness sufficient for supporting the intended traffic load with a maximum allowable deflection of three-quarter ($\frac{3}{4}$) inch. Steel plates must completely cover the open trench and have a minimum overlap on adjacent shoulder areas of eighteen (18) inches. Sandy, gravelly soils with large angles of repose require larger plated shoulder areas to ensure the safety of the excavation.
- E. All steel plates must be treated with an asphalt based sound dampener, such as Soundamp E available from SOUND SEAL, or equivalent.
- F. On all High Concern Areas and where specified by the BPWD, all steel plate decking must have a skid-resistant surface equal to or greater than the adjacent existing roadway surface. Skid-resistant plates must be beige in color, unless otherwise directed by the City of Boston.

1. During the Winter Moratorium period (November 15 - April 15) all steel plates used to secure an excavation are required to be skid-resistant, unless otherwise authorized by PWD.
 2. During the regular construction season (April 15 - November 15) the use of skid-resistant plates is mandatory on all High Concern Locations. (e.g. crosswalks, sidewalks, bike lanes, major intersections, and locations at the bottom of a steep decline). The City reserves the right to mandate that all locations be secured with skid-resistant plates if they feel the added safety is required.
 3. The City may require the use of skid-resistant plates at any point, or time, or location where it feels there is sufficient need.
- G. All plates shall identify the Permittees name and 24-hour phone number. Company name and phone number shall be identified on both sides of each plate.
- H. Steel Plate Installation Requirements:
1. Any location requiring the use of steel roadway plates for more than **three (3) days** shall require the plates to be recessed and secured to the adjacent pavement surface, unless otherwise authorized by the BPWD.
 2. All non-recessed plates must be ramped with a two (2) foot wide berm of modified cold patch or Silvex in the travel direction and a one (1) foot berm in the non-traveled direction, unless otherwise authorized by a city engineer or qualified representative. All modified cold patch shall be blotted with stones to prevent tracking. Use of Hot Mix Asphalt to ramp a roadway plate must be approved by PWD.
 3. During the Winter Moratorium Period steel slates are not allowed on any street in the City of Boston without prior approval by the BPWD. **In the event that placement of the steel plate is unavoidable and has been approved by the BPWD, the Permittee must recess the plates. The BPWD must be notified of all plate locations** by calling 617-635-4950, and faxing the locations to 617-635-7551 and 617-635-7498.
 4. The plates shall be secured to prevent any lateral movement. If movement occurs, the Permittee will be notified to re-secure plating immediately; otherwise the Permittee shall be charged 115% of the cost incurred by the City of Boston to secure the Permittees plates.
 5. The Commissioner may require recessing steel plates in special situations such as Public events, etc.
- I. When steel plates are removed all pins and spikes must be removed and the holes must be filled with a fine bituminous concrete mix.

Sec. 8.03 Barriers and Fencing

On such locations where an open excavation site is to be left unattended, the site must be secured as defined by the Boston Transportation Department Traffic Management Plan and the Commonwealth of Massachusetts General Law Chapter 82A: **(520 CMR M.G.L. c. 82A § 14.04)**

1. A continuous barrier not less than six feet in height shall surround the unattended trench.
2. All barriers shall be of adequate strength and shall be supported in a manner that will allow them to be seen by the motorist and provide a stable support not easily blown over by the wind or traffic.
3. Trench barriers adjacent to high speed traffic may include traffic control barrels ballasted by sandbags or temporary pre-cast concrete barriers as components.
4. Trench barriers comprised of multiple sections shall allow not more than four inches between each section. Adjacent sections must be securely fastened to each other.
5. Any openings between the ground and barrier shall not exceed 4 inches.
6. Barriers shall be at a sufficient distance from the trench to be unaffected by changing conditions of the trench site

SECTION 9.00

BACKFILL REQUIREMENTS

Sec. 9.01 Backfill Material

- A. Pavement backfill material shall be MASSDOT M1.03.11 Processed Gravel for sub-base. The Gravel material, whether delivered to the site or selected from the spoils, must pass a three (3) inch square mesh sieve and shall not contain frozen material.

<u>Sieve Designation</u>	<u>Percent Passing</u>
3 inch	100
1½ inch	70-100
¾ inch	50-85
No. 4	30-60
No. 200	30-60

- B. Material selected from the spoils shall be considered re-used gravel and must be tested by a professional Engineer and approved by the City of Boston prior to use.

No excavated pavement shall be used, or mixed in, with any backfill material unless specifically approved of by the City or its representative after visual inspection for that individual work site or excavation.

- C. The use of recycled backfill material must be approved by the BPWD and will only be made on a case by case basis after the Permittee submits test results signed by a Professional Geotechnical Engineer certifying that:

1. Recycled material is inert consisting of hard, durable stone, coarse sand and allowable recycled material as described below.
2. Not more than 50% of the material shall be comprised of recycled material such as non-reinforced cement concrete. Not more than 5% of the recycled material shall be recycled asphalt (RAP).
3. Cement Concrete shall have less than twelve (12) percent volume by weight after five (5) cycles by the magnesium sulfate soundness test.
4. The recycled material shall be free of glass, brick, loam, clay, roots, wood and other deleterious material.
5. The gradation shall meet the requirements for MassDOT Processed Gravel for Sub-base M.1.03.1.
6. The coarse aggregate shall have a percentage of wear, by the LA Abrasion Test, of not more than 50.

- D. Control Density Fill (CDF)

1. Certain circumstances as determined by the BPWD may require Controlled Density Fill (CDF) as an alternate backfill material. The BPWD shall allow Controlled Density Fill (CDF) under the following conditions:
 - a. When gravel backfill cannot be effectively compacted around existing structures, multiple conduit, ducts, or pipes;
 - b. Trenches exhibiting pockets and voids along the trench walls; or
 - c. When it is necessary for any Permittee to make an opening into a street that is in conflict with street reconstruction or resurfacing by the BPWD.

2. Controlled Density Fill (CDF) backfill material shall be Type IE or 2E, Excavatable.
 - a. The CDF ingredients shall comply with the following:

i. Portland Cement	AASHTO M85
ii. FLY ASH	AASHTO M295, Class F
iii. Fine Aggregate	M.4.02.02
iv. Air Entraining Admixtures	M.4.02.05
 - b. The CDF must meet the following requirements:

i. Compressive Strength @ 28 days	= 30 - 80 psi (210-550kPa)
ii. Compressive Strength @ 90 days	= 100 psi max. (700kPa max.)
iii. Slump	= 10 -12 inches (250-300 mm)
iv. Air	= 1%-3.0%
 - c. Fly Ash CDF shall not be placed if the temperature falls below 20 degrees Fahrenheit.
 - d. Type 2E Excavatable Flowable Fill may be approved by BPWD with adequate justification of need and benefits.
3. A certified, approved CDF mix design must be submitted prior to use. The BPWD shall dispatch an inspector to the production plant to conduct quality assurance testing and inspection.
4. CDF is not to be used in situations that shall cause floating of utility lines, or in the presence of ductile iron, cast iron or steel pipes.
5. CDF placement in trenches must be fully barricaded or under police supervision for a minimum of twenty-four (24) hours after the pour, or until a set is reached that shall prevent a hazard to animals or humans.
6. Certain utility lines may be separated with a cover of sand backfill prior to CDF.
7. **In no case shall CDF come in contact with the Hot-Mixed Asphalt layer of a street. CDF shall be allowed as a bedding material around ducts, conduit and pipes only.** Thereafter, backfill shall be gravel in accordance to Section 9.02. The interface between the top of the CDF and bottom of the Hot-Mixed Asphalt shall have a minimum twenty-four (24) inch base of processed or approved recycled gravel to allow internal pavement structure lateral drainage.

E. Annual Gravel Renewal Requirements

1. At the start of every Construction Season each Permittee must submit lab-certified current maximum dry density, and corresponding moisture content (ASTM D 1557) of the granular material to be used by their company. Granular material reports must include stockpile location address, and a detailed description of tested material stockpiled in the event additional testing is necessary.

Note: These reports must be updated each spring; lab reports from the previous season shall not be accepted.

The City reserves the right to require periodic random testing of all backfill material, and/or to perform gravel testing of certified suppliers at any time. The Permittee shall be responsible for the cost of the testing.

2. Certified reports must document the name of the Contractor engaged in backfilling operations of Boston streets, control test strip location address, model name and type of equipment used, and certified gravel test results.
3. **Permittees have the option of notifying the City that they will be obtaining gravel from an already approved source that is subject to annual testing and approval.**

4. Laboratory test results signed by a Professional Geotechnical Engineer must certify that backfill material conforms to the requirements of MASSDOT M1.03 Processed Gravel for Sub-base must include:
 - a. Sieve Analysis
 - b. Maximum Dry Density
 - c. Moisture Content
 5. If recycled gravel backfill is proposed, laboratory test results signed by a Professional Engineer must be submitted and shall include:
 - a. Sieve Analysis
 - b. Maximum Dry Density
 - c. Moisture Content
 - d. Aggregate Soundness Test
 - e. Los Angles Abrasion Test
 - f. Percentage Volume by Weight of material classification (i.e. brick, concrete, etc.) in Backfill
 6. The Permittee must have on site, and provide to the CIU inspector upon request, certification that the backfill material conforms to the City requirements.
- F. The Permittee is expected to reject any unacceptable material even if from an approved source.**

Sec. 9.02 Placement of backfill/base material

- A. The pavement structure backfill sub-base shall be spread and compacted in layers not exceeding **six (6) inches** in loose depth, unless otherwise authorized by the BPWD. The gravel shall be compacted to not less than 95% of the maximum dry density in accordance to ASTM D1557, and to the depth required by these BPWD's Rules and Specifications.
- B. Gravel shall be placed up to three (3) inches below grade of the existing asphalt so that it may receive three (3) inches of compacted hot mix asphalt temporary surface.
- C. All concrete sidewalks must be placed on a bed of **six (6) inches** of compacted gravel.
- D. Curb stones must be placed on a bed of **six (6) inches** of crushed stone.
- E. The Permittee shall notify the BPWD before backfilling any excavation, allowing adequate time for inspection by the BPWD's Construction Inspection Unit (CIU) as outlined in Section 14.01.
- F. Backfilling shall occur on the same day as the excavation. If not possible due to the complex nature of work, emergency, or unpreventable conditions, the Permittee must notify the BPWD immediately upon determining backfilling cannot occur. The Permittee must take all appropriate measures to protect public safety and infrastructure until work commences.
- G. If proposed backfill lift thickness exceeds **six (6) inch** loose layers, additional certified reports signed by a registered Professional Engineer engaged in this business shall be required. All Contractors must demonstrate proof of proper compaction and maximum dry density through a control test strip.
- H. All construction materials must be protected from freezing using acceptable standard industry practices.
- I. Broken pavement, stones greater than a three (3) inch diameter, roots and other debris shall not be used in backfill. No material shall be left within the right-of-way once the repair and/or installation has been completed.
- J. If a layer of concrete, cobblestone, granite pavers, or other supporting material exists, the Permittee shall install concrete to match the existing depth prior to the installation of temporary pavement.
- K. When gravel backfill cannot effectively be compacted to 95% of the maximum dry density of the material with traditional equipment due to multiple conduits, ducts and pipes, or manhole/catch basin structures then Control Density Fill (CDF) may be required.

- L. The BPWD may require nuclear field density testing (AASHTO T-238 and T-239) for compaction and moisture prior to adding materials for subsequent layers as specified in Section 9.01(E). All testing expenses will be the responsibility of the Permittee.
- M. When shoring, sheeting and bracing are used, they are to be removed during the backfilling progresses. When backfilling has reached the bottom of a brace, its horizontal ranger shall be removed. This procedure shall be repeated throughout the backfilling operation. The sheeting shall be pulled in short increments with every precaution taken to avoid significant lateral movement at the sides of the trench. All backfill in the space formerly occupied by the sheeting shall be thoroughly and properly compacted during and after pulling the sheeting.
- N. Whenever standing water is located in the excavation area, the water and saturated soils shall be removed by pump or other means before backfilling operations begin. If water remains due to a high water table then the following backfilling methods shall apply:
 1. Filter fabric shall be placed to form a lining for the crushed stone backfill to be wrapped in. The filter fabric must completely cover the stone backfill when placed. Crushed stone meeting MASSDOT standard specifications must be placed to the height of saturation and completely wrapped in filter fabric.
 2. Backfill requirements shall be dependent upon vertical trench area absent of saturation. A minimum of twenty-four (24) inches of processed or approved recycled gravel shall be spread in layers not exceeding **six (6) inches** in loose depth and compacted to no less than 95% of the maximum dry density of the material, ASTM D1557, up to the base of temporary pavement. Should a vertical zone exist between the saturation zone and gravel zone, the backfill methods outlined this section may be utilized.
 3. When the excavated material is primarily clay, it shall be allowed for use as backfill only upon the written approval of the BPWD with the intention of minimizing differential settling. If approved, an eighteen (18) inch compacted layer of processed or approved recycled gravel must be placed prior to the temporary three (3) inch hot-mix asphalt surface. Backfilling, using in-situ clay, must be conducted by design and observation of a registered Professional Geotechnical Engineer.

Sec. 9.03 Affected Sub-Base by Utility Infrastructure

Whenever the sub-base of a public right-of-way is adversely affected by damaged or faulty underground utility infrastructure resulting in settlement, washout, or other issue, the owner of the infrastructure responsible for the damage shall be liable for all necessary repairs.

The City may require the use of infrared, thermal, or ground-penetrating radar testing to determine the extent of voids and affected sub base beyond visibly damaged areas. The City may require additional soil and structural testing to check for gravel and roadway instability at the cost of the responsible party.

SECTION 10.00

TEMPORARY PATCHING OF ROADWAY OPENINGS

Sec. 10.01 General

- A. The Permittee shall be responsible for the proper placement and maintenance of the temporary pavement. The Permittee is required to keep the temporary pavement in acceptable condition for three (3) years.
- B. The Permittee shall notify the BPWD before any paving operations begin, allowing adequate time for inspection by the BPWD's Construction Inspection Unit (CIU) as outlined in Section 14.01(B).
- C. The Permittee shall restore and resurface any disturbed area as a result of excavation, and any damage caused by the Permittees activities, immediately upon completion of proper backfilling operations, unless otherwise authorized by BPWD.
- D. The Permittee shall not be required to repair pavement damage outside of their work zone existing prior to the excavation unless their cut results in small floating sections that may be unstable, in which case the Permittee shall remove the unstable portion and the area shall be treated as part of the excavation.
- E. Hot-Mixed Asphalt paving of trenches of over one-hundred (100) feet in length shall be paver-applied, unless otherwise authorized by the BPWD.
- F. The Permittee is responsible for applying and maintaining temporary painted pavement markings throughout the construction process. Thermoplastic pavement markings must be replaced in accordance to Section 10.06(B).

Sec. 10.02 Materials

- A. All temporary pavements shall be either Boston Dense Binder or Boston Modified Top for the base course and Boston Top for the top course; OR MassDOT M3.11.00 Class I Bituminous Concrete or MassDOT 9.5mm Superpave hot mix asphalt.
- B. If emergency repairs are completed when hot mix asphalt plants are closed, the Permittee may use Modified cold patch or Modified Winter Stockpile mix, as outlined in Appendix A. The Permittee is required to maintain the repair with Modified cold patch or Modified Winter Patching Material to the satisfaction of the BPWD until hot mix asphalt is available. When hot mix asphalt becomes available the Permittee is required to remove all Modified cold patch or Modified Winter Patching Material and perform the Temporary Repair as described in Section 10.00.
- C. A Tack Coat Emulsion shall be painted to the pavement sidewalls of the entire excavation to prevent water infiltration.
 - 4. Tack coat shall consist of emulsified asphalt, Grade RS-1, conforming to Section M.3.03.0 of the Commonwealth of Massachusetts Department of Public Works Standard Specifications for Highways and Bridges dated 1988.
- D. The placing temperature of Hot-Mixed Asphalt mixture shall be between 255°F (degrees Fahrenheit) and 325°F (degrees Fahrenheit). All compaction rolling shall be completed before the mixture cools below 150°F (degrees Fahrenheit), or that temperature allowed by the asphalt binder manufacturer. This shall be checked using a thermometer suitable for this type of work.

Sec. 10.03 Methodology

Temporary pavement shall be installed according to these specifications, which includes the placement, compaction and workmanship in accordance with the applicable provisions of the MassDOT Standard Specifications for this material.

- A. On all temporary asphalt repairs, HMA must be placed in two (2) compacted lifts each having a depth of one-and-one-half (1½) inches resulting in a total depth of three (3) inches.
- B. Hot-Mixed Asphalt materials shall be laid upon an approved, clean, dry, compacted surface, spread and struck off to the established grade and elevation giving regard to the loss in depth between loose and compacted mixtures. Immediately after the hot mix asphalt mixture has been spread, struck off, and surface irregularities adjusted, it shall be thoroughly and uniformly compacted. Tack Coat Emulsion shall be applied to provide a tight seal preventing water infiltration to the existing pavement.
- C. If a layer of pavement material other than Hot-Mixed Asphalt exists (Portland Concrete Cement, brick, block, etc.) it must also be replaced with an equal depth of concrete unless otherwise directed by the BPWD.
- D. Each one-and-one-half (1½) inch layer of Hot-Mixed Asphalt shall be compacted separately, meeting the requirement of 92% minimum compaction of the standard laboratory maximum theoretical density for the specific material.
- E. Mechanical compactors shall be allowed for repairs of fewer than ten (10) square yards in area. Repairs exceeding ten (10) square yards shall be rolled with an appropriately sized power-driven, steel-wheeled roller to obtain specification density.
- G. Temporary paving shall be uniform, smooth and level to the adjacent pavement surface.
- H. Any cast iron structure located within the excavated area must be reset to the existing grade of the surrounding roadway, as specified in Section 11.00.
- I. The Permittee is responsible to repair cave-outs and undermined areas of an excavation prior to paving as defined in Section 6.03. The full perimeter of this opening shall be cut square to the full depth of the existing pavement. All edges shall be vertical and clean of debris.
- J. The Permittee shall take every reasonable measure to completely install temporary paving on the same day excavation occurs. Same day paving is required if work is not expected to be Continued the next day, regardless of location, unless otherwise approved by BPWD.
- K. Any bar holes made in the street or sidewalk of any public way must be immediately filled with compacted, granular material up to three (3) inches below the paved surface with the remaining three (3) inches filled with an approved asphalt or concrete plug.

Sec. 10.04 Guaranteed Street Patching

All construction procedures on Guaranteed Streets must abide by the following restrictions:

- A. All openings must be saw-cut prior to excavation.
 - 1. If the original saw cut area is damaged during construction, the opening must be saw cut again prior to paving operations.
- B. A CIU inspector must be present for all backfilling and paving operations unless otherwise authorized by the Public Works Department.
- C. **ALL** phases of patch and trench paving on a Guaranteed Street shall be rolled with an appropriately sized power-driven, steel wheeled roller to obtain specification density. If a mechanical roller is unable to fit within the patching area during the **BINDER** course, a plate compactor will be allowed for the binder course compaction only.

- D. The City of Boston will not sign-off on any roadway patch performed on a Guaranteed Street until after a 90-day Re-Inspection has been performed to verify that no settling due to poor compaction has occurred.
 - 1. Any patch identified by the CIU as being unacceptable to City Specifications must be repaired before any new service permits will be issued to that Permittee.
- E. On Guaranteed Streets, all Permittees must power-wash Dig Safe markings upon completion of job unless otherwise authorized.

Sec. 10.05 Utility Repair Tags

All excavations secured with cold patch, sylvex, or hot mix asphalt, whether temporarily or permanently, are required to be marked with Utility Repair Tags by the Permittee.

- A. Utility Repair Tags are installed during the final lift of paving. The Markers shall be imbedded at zero grade tolerance, or slightly below, and must be of one piece construction. The use of nails to secure Identification Markers is prohibited.
- B. Markers must contain the year the patch was performed, the Permittee's customer ID number, and PWD assigned identifier ID where applicable, and must be of the color assigned to your company.
- C. Excavations up to 50 linear feet must have one tag placed in the center of the patch.
 - An additional tag must be placed in the center of every lateral connection that branches off the main patch or trench.
- D. Excavations greater than 50 linear feet and up to 100 linear feet must have a tag placed at either end of the patch or trench approximately 12 inches from the edge.
 - An additional tag must be placed in the center of every lateral connection that branches off the main patch or trench.
- E. Excavations greater than 100 linear feet and up to 400 linear feet must have a tag placed in the beginning, center, and end of the trench, with the beginning and end tags approximately 12 inches from the edge.
 - An additional tag must be placed at every intersecting street.
 - An additional tag must be placed in the center of every lateral connection patch that branches off the main trench.
- F. Excavations greater than 400 linear feet must have a tag placed at the beginning and end of the trench approximately 12 inches from the edge, and at every 200 linear foot intervals.
 - An additional tag must be placed at every intersecting street.
 - An additional tag must be placed in the center of every lateral connection patch that branches off the main trench.
- G. Utility Repair Tags should not be placed within 12 inches from any casting unless space does not allow.
- H. Utility Repair Tags should be placed away from direct wheel traffic when able.
- I. On all cuts partially or fully within the parking lane, the tag should be placed on the center-line side of the patch or trench, 12 inches from the edge of the patch or trench.
- J. Utility Repair Tags must be placed in all temporary and permanent asphalt patches during all phases of construction.
- K. **Failure to use the required Utility Repair Tags may result in suspension of new permit requests and shutdown of all active jobs.**

Sec. 10.06 Loop Detectors & Pavement Markings

Street markings (centerlines, crosswalks, stop bars, lane markings, etc.) and traffic loops must be replaced no later than seventy-two (72) hours after the completion of work, or as directed by the BTD. If work disturbs centerlines or lane markings on arterial or collector streets the Permittee shall, and has the duty and obligation to, place reflective markers immediately after pavement is placed. The cost, including incidental items such as Tack Coat Emulsion, crack seal, towing, and police details used in making all repairs is the sole responsibility of the Permittee.

All traffic devices, signs, pavement markings or traffic loops disturbed, damaged, altered or removed by the Permittee must be promptly replaced by the Permittee, unless otherwise directed by BTD, in accordance with the BTD and the State of Massachusetts Rules and Specifications.

Loop Detectors:

1. Slots in the bituminous concrete pavement shall be cut with a concrete sawing machine to a uniform depth as shown in the BTD's details, and as required in order to accommodate all necessary loop turns or leads. Dry cutting shall not be allowed. Diagonal saw cuts of at least twelve (12) inches in length must be made at each corner to prevent sharp bends in the wire. The diagonal cuts shall overlap the main cuts so that each wire-bearing slot has full depth.
2. The cut shall be cleared of debris and thoroughly dried before installation of the wire loop. The wire shall be inserted in the cleared, dried slot with a blunt wooden or plastic tool that shall not damage the insulation.
3. Loop wire crossing joints or noticeable cracks shall be protected with an approved insulating sleeve for at least six (6) inches on either side of the joint or crack, and the ends of the sleeving material shall be taped to prevent entry of slot sealing compound in order to prevent bonding of the wire to the pavement. The sleeving shall be furnished and installed at no extra cost to the City, and shall be incidental to the induction loop item. The end of the one-and-one (1½) half inch PVC conduit shall be plugged with an approved material, and loop wires entering the conduit shall be sleeved and taped as outlined above
4. No splice shall be used in the installation of any inductive loop or its lead-in to the appropriate pull box. Loop lead-in wire shall be spliced to the loop in the handhole or pull box and shall be installed to the controller cabinet without any additional splices.
5. The pavement slots for the bituminous concrete pavements shall all be filled with an approved two-component embedding sealer strictly in accordance with the directions of the manufacturer. The sealer shall be specifically recommended by the manufacturer for this use in new and existing bituminous concrete pavements.

Pavement Markings:

Street markings (centerlines, crosswalks, stop bars, lane markings, etc.) and traffic loops must be replaced no later than seventy-two (72) hours after completion of work, or as directed by the BTD and Section 10.06.

During Construction (Paint will be allowed)

1. During construction the Permittee is responsible for maintaining all pavement markings interrupted by the excavation work. The Permittee may use paint as a temporary measure. If the Permittee does not temporarily maintain the pavement markings the job will be shut down until the temporary pavement markings have been installed, as required.

Post Construction (Only thermoplastic will be used)

1. When any portion of a crosswalk has been interrupted or affected by excavation work the Permittee is responsible for replacing the entire crosswalk, unless otherwise approved by BPWD/BTD.
2. All reflectorized pavement markings and equipment shall be furnished and applied in accordance with MassDOT Specification dated 1988, Sections 860 and M7 subsection X7.01.20, latest revisions, except as otherwise specified.

3. Thermoplastic pavement markings must be placed within seventy-two (72) hours of completing permitted excavation work.
4. All excess thermoplastic deposits shall be removed by a method that is not detrimental to the roadway surface and is acceptable to the BTB, at no additional expense to the City of Boston.

Bike Lanes:

1. If any portion of a bike lane is affected by construction the Permittee must obtain the appropriate bike lane layout sketch from the BTB and replace the markings within seventy-two (72) hours of completing the permitted excavation work.
2. All chevrons, lane lines, green stopping boxes, and other pavement markings associated with bike lanes must be replaced according to BTB specifications and layout.
3. When working within a bike lane all roadway plates used to protect the excavation work must have a skid-resistant coating.

SECTION 11.00

CASTINGS AND SUBSTRUCTURES

Sec. 11.01 General

- A. Per City Ordinance 11-6.20, any person, corporation, trust, partnership, governmental body, board, commission, authority, agency, or body politic and corporate who occupies the public or private ways of the City of Boston with proper permit from the Public Works Department or otherwise, as a condition of such occupation, shall be responsible and liable for the maintenance and restoration of all pavement within thirty (30) inches of any and all of the appurtenant structures where they intersect the surface of the public way, roadway or sidewalk, and shall maintain said areas and repair any defect in its entirety which lies wholly or in part in the said area.
1. Defects shall include, but not be limited to: pot holes, chuck holes, frost heaves, cracking, spalling, settling, delaminating or patch repair.
 2. Damaged or improperly set cast iron infrastructure will be submitted to the responsible entity for repair. The City expects that any cast iron structure submitted will be scheduled for repair within 2 weeks of notification.
 3. The Public Works Department expects that each company will produce an annual in-depth evaluation of its cast iron infrastructure and create a plan for repair or replacement of any infrastructure in poor condition.

Sec. 11.02 Casting Replacement and Installation

- A. All existing cast iron structures to be reset shall be adjusted to change in line or grade.
- B. All castings shall be set on brick masonry, where necessary, to conform to the line and grade required. After casting has been set to grade on masonry using 50/50 cement and sand Type 3 mixture, cast iron structures must be encased in bituminous concrete binder or high early strength concrete with a minimum depth of **six (6) inches**, and for a distance of eighteen (18) inches around the outside of the casting.
1. Contractors are not allowed to use mortar, brick pieces, or brick chips to construct the structural shim between the catch basin frame, or manhole casting frame, and the lower structure. If a full brick cannot be accommodated between the catch basin frame, or manhole casting frame, and the lower structure then galvanized steel plates must be used to construct the structural shims.
 2. Steel shims must be a minimum of four (4) inches in width and eight (8) inches in length. Steel plates may vary in thickness as required.
 3. The Boston Water and Sewer Commission may designate a concrete collar and ring on some adjustments. See Appendix D.
- C. The bituminous concrete binder around the cast iron structure shall be placed in two equal courses with each being thoroughly compacted using a pneumatic tamper.
- D. The Permittee may apply for the use of new material or technologies to secure and install their cast iron structures with the BPWD. Approval of new material or technologies may be provisional.
- E. Cast Iron Structure Repair Requirements

The CIU, or other BPWD representative, will notify all applicable Permittees of cast iron structures identified as being out of compliance with these Rules and Specifications. Permittees must complete repairs according to the following schedule:

Erosion of HMA Around Castings Repair Schedule

1. **Public Safety:** cast iron structures with erosion of a six (6) inch wide area or more adjacent to the casting of two (2) or more inches in depth.
 - a. Within three (3) hours of notification the utility must make temporary repairs of eroded area by patching with cold patch, HMA, or sylvex, unless otherwise authorized by the Public Works Department.
 - b. Within thirty (30) days of the temporary repairs the Permittee will be required to cut-out around the casting, reset the structure if below grade, and place a permanent hot top repair, unless otherwise authorized by the Public Works Department.
2. **Non Public Safety:** minor erosion around the casting.
 - a. Within two (2) business days of notification that utility will make repairs to eroded area by patching erosion with cold patch, HMA, or sylvex, unless otherwise approved by BPWD.
 - b. Within thirty to sixty (30-60) days of notification the Permittee will be required to cut-out around the casting, reset the structure if below grade, and place a permanent hot top repair, unless otherwise approved by the BPWD.

Cast Iron Structure Grade Adjustment

1. **Public Safety:** two (2) or more inches of settlement of casting below street grade.
 - a. Cast iron structures settled two (2) or more inches must be reset to grade of the roadway within seven (7) days of notification, unless otherwise authorized by the Public Works Department.
 - b. The BPWD may require the Permittee to temporarily place cold patch, HMA, or sylvex over the cast iron structure within three (3) hours of notification to bring the area to street grade until permanent repairs can be scheduled in order to address public safety issues.
 2. **Non Public Safety:** less than two (2) inches of settlement.
 - a. Cast iron structures not to grade with the roadway must be reset to grade of the roadway within thirty to sixty (30-60) days of notification, unless otherwise authorized by the Public Works Department.
 - b. Depending on the volume of cast iron infrastructure needing repair or replacement the City may extend its thirty to sixty (30-60) day repair requirement so long as the utility company is repairing or replacing its infrastructure at a rate acceptable to the City.
- F. The City may request that utility companies use alternate cast iron infrastructure or installation methodologies on a trial basis for cast iron replacement procedures as long as their infrastructure will not be compromised, and no public safety concern will be created. The City and utility company can then agree on an approved methodology for future installation procedures.
- G. **Further information regarding the repair of cast iron structures during the Winter Moratorium, see Section 13.**

SECTION 12.00

RESTORATION OF SIDEWALKS

Sec. 12.01 General

The Permanent restoration of sidewalk, walkways and/or driveways is the responsibility of the Permittee. The permanent restoration must be completed no later than sixty (60) days after completion of any temporary restoration. At the Permittees discretion, the permanent restoration can take place immediately after backfilling operations. **No Permittee shall be allowed to perform the permanent sidewalk restoration during the Winter Moratorium period, November 15th and April 15th, unless otherwise authorized by the BPWD.**

The Permittee will guarantee a three (3) year warranty on all work performed. Any defect identified by the city within the three-year warranty period must be repaired to city specifications and require a sign off by the city inspector.

If the City determines after the expiration of the warranty period that inferior materials or poor workmanship resulted in a failed product, then the warranty will still be enforced and the Permittee will be responsible to make necessary repairs.

NOTE: *Sidewalk Flag (Concrete)* shall be defined as the area of concrete extending from the edgestone to the property line confined within perpendicular score lines to the roadway. All parallel score lines to the roadway are considered as part of the sidewalk flag.

- A. The Permittee is required to maintain a compliant temporary pedestrian passageway, including signage, around the construction area according to ADA and AAB standards. The Permittee must maintain safe, unobstructed vehicular traffic throughout construction.
- B. If the sidewalk is to be closed at any time, the Permittee must provide two (2) MUTCD R9-10 "Sidewalk Closed – Use Other Side" signs on either side of the site at the nearest intersecting street corners.
- C. Any excavation made in a concrete sidewalk will result in the full restoration of the concrete sidewalk flag, unless otherwise directed by the BPWD. The flag is defined as the area of sidewalk extending from the edgestone to the property line confined within perpendicular joints or score lines to the roadway. All parallel joints or score lines to the roadway are considered as part of the sidewalk flag.
- D. Any excavation made in a sidewalk other than concrete, e.g. brick, bituminous, or specialty, will result in the restoration of the sidewalk encompassing as much sidewalk area as necessary for accessibility compliance, unless otherwise directed by the BPWD.
- E. All Permittees will be responsible for maintaining an internal database of their sidewalk openings. The City reserves the right to request access to reports from that database

The Permittee shall notify the BPWD in writing or email regarding the completion of any permanent restoration or repair, setting forth the date of completion. The notification should include the permit number and completion date.

- F. All work, operations, and activities shall be performed in a manner that shall leave any lawn, garden, or grassy area clean of debris and in the same condition that existed before the work began. The Permittee shall not remove, even temporarily, any trees or shrubs without first obtaining the consent of the Boston Parks Department or applicable private property owner.
- G. If any excavation disrupts a layer of Geofabric Material, it must be replaced in accordance to Section 6.03(D).
- H. If an excavation cuts through an existing under-drain system it shall be repaired by the Permittee, in accordance with the BPWD's Rules and Specifications or as directed by BPWD, at no additional cost to the City of Boston.

Sec. 12.02 Materials: Concrete Mix Design & Specifications

- A. Concrete shall be air entrained, 4000 psi, and three-quarter ($\frac{3}{4}$) inch maximum size aggregate with 660 lbs of cement per cubic yard of concrete. Entrained air shall be between 5.5% and 7.5% with a slump not to exceed four-and-one ($4\frac{1}{2}$) half inches. ASTM C150 Type 11 cement shall be used. The use of mineral additives or supplements such as Ground Granulated Blast Furnace Slag, Fly Ash, Silica Fume or Micro Silica is prohibited. Normal weight aggregate shall conform to ASTM C33, containing no deleterious substances, which cause surface spalling. The Permittee must certify that no alkali reactivity is produced with the proposed aggregate-cement combinations when tested in accordance with ASTM C227.
1. All concrete shall be produced in accordance with the approved mix designs. The Permittee shall comply with ACI 304 and 309 as herein specified.
 2. The Permittee shall be allowed to add water for slump adjustment, but is required to adhere to the standards of ASTM C94. This standard allows for slump adjustment on site if the truck arrives with a concrete slump less than four-and-one-half ($4\frac{1}{2}$) inches. This shall only be allowed if the following conditions are satisfied:
 - a. The water addition shall not increase the water cement ratio above the maximum permitted by the specification.
 - b. The water shall be added to the entire batch, not in the middle or end of the batch.
 - c. Water addition is not allowed to by-pass the $1\frac{1}{2}$ hour or 300 revolution criteria.
 - d. Water shall be added into the batch at the head section of the drum or by injection into the head and discharge section of the drum.
 - e. Water added requires an additional 30 revolutions at mixing speed.
 - f. The driver's delivery ticket shall document any water withheld at the batching plant.
- B. Concrete with a slump exceeding four-and-one-half ($4\frac{1}{2}$) inches, air entrainment outside of the allowable range, or of a temperature exceeding (90°F) ninety degrees Fahrenheit is not to be installed. All concrete must be placed within ninety (90) minutes of when it was batched as recorded on the delivery slip. The 90 minutes can be exceeded only if the concrete remains workable, there is no appreciable loss of slump, no water has been added, and the temperature does not exceed (90°F) ninety degrees Fahrenheit.
- C. Concrete Mix Designs
1. Substantiating data for each concrete mix design to be installed must be submitted to the BPWD not less than six (6) weeks prior to the first placement of concrete. Data for each mix shall at a minimum include the following:
 - a. Mix identification designation (unique for each mix)
 - b. Statement of intended use.
 - c. Mix proportions, including all admixtures.
 - d. Manufacturer's data and/or certifications verifying conformance of all mix, materials, including admixtures with specified requirements.
 - e. Wet and dry unit weights.
 - f. Entrained air content, ASTM C138.
 - g. Design slump, ASTM C143.
 - h. Required average strength qualifications data per ACI 301-391 and 392. Submit separate qualification for each production facility that will supply concrete to the project.

Sec. 12.03 Methodology: Temporary Patching of Sidewalk Openings

- A. No sidewalk opening shall be left in gravel. At the close of each day all openings that are backfilled must be made safe and passable with steel plates, hot mix asphalt, or temporary cold patch to prevent the spread of dust and debris from inclement weather and/or traffic. These requirements shall be applied to all emergency openings.
- B. The Permittee shall be responsible for the proper placement and maintenance of temporary pavement on sidewalks prior to permanent restoration. The Permittee is required to keep the temporary sidewalk in acceptable condition for sixty (60) days or until permanent repairs have been completed.
- C. If temporary repairs are completed when hot mix asphalt plants are closed, the Permittee may use Modified cold patch or Modified Winter Stockpile mix as outlined in Appendix A. The Permittee is required to maintain the repair with Modified cold patch or Modified Winter Patching Material to the satisfaction of the BPWD until hot mix asphalt is available. When hot mix asphalt becomes available the Permittee is required to remove all Modified cold patch or Modified Winter Patching Material and perform the Temporary Repair as described in Section 10.00.
- D. All repairs must fully comply with ADA and AAB standards. Any repairs found to be in violation of ADA or AAB standards become the sole responsibility of the Permittee.
 - 1. All sidewalk repairs shall have cross slopes adhering to ADA and AAB standards. The preferred cross slope is 1.5%. **In no instance shall the sidewalk cross slope exceed 2%.**
 - 2. Pedestrian ramps shall have slopes adhering to ADA and AAB standards. The preferred ramp slope and side slope is 7.5%. **In no instance shall the ramp or side slope exceed 8% (1:12).**
 - 3. A level landing of forty-eight (48) inches in length shall be provided at the top of the pedestrian ramp. The width of the landing shall be the same as the width of the curb cut. The preferred landing dimensions shall be forty-eight (48) inches by forty-eight (48) inches. The slope of the landing shall not exceed 2% (1/50") in any direction.
- E. Temporary paving shall be uniform, smooth and level to the adjacent surface.
- F. Permittees who perform temporary sidewalk patches or permanent asphalt sidewalk repairs are required to mark their patches with Utility Repair Tags, as specified in Section 10.05.
- G. Any bar holes made in the sidewalk of any public way shall immediately be filled with compacted, granular material up to three (3) inches below the paved surface with the remaining three (3) inches filled with an approved asphalt or concrete plug.
- H. Appendix F contains the details section regarding pedestrian ramps and should be referred to for any construction issues.

Sec. 12.04 Methodology: Permanent Restoration of Sidewalk Patches

- A. The Permittee shall, and has the duty and responsibility to, guarantee the workmanship of the permanent restoration of any sidewalk, driveway, curb, esplanade, and lawn area for a period of three (3) years. The Permittee is required to establish a healthy ninety (90) percent grass growth through two (2) consecutive mowing of any esplanade or lawn repair. The BPWD strongly recommends that the Permittee photograph and date any horticultural restorations and healthy grass growth after two (2) mowing, and submit this documentation to the BPWD.
- B. **Whenever an entity affects a sidewalk, walkway, or curb where the sidewalk crosses a curb into a street without an existing pedestrian ramp, that entity is responsible for installing a new curb cut and pedestrian ramp to the specifications of the BPWD. The Permittee is not responsible for the installation of a reciprocated ramp beyond their work limits.**

- C. It shall be the responsibility of the Permittee to perform all necessary restoration beyond the limits of the excavation affected by their construction activity. This shall include, but shall not be limited to, restoration of lawns, shrubs, gardens, curbing, underdrain, fabrics, fences, walls, signage, etc.
- D. The Permittee will be responsible for reset the edgestone to the appropriate grade, in accordance with the BPWD specification. If the edgestone is undermined, then it must be removed and reset accordingly. If additional sidewalk flags need to be removed to reset the curbstone, it will be the responsibility of the Permittee to do so.
- E. **If any portion of an existing pedestrian ramp is disturbed by construction, the Permittee shall be required to reconstruct the Pedestrian ramp to current ADA and AAB regulations.** All costs of reconstruction of the Pedestrian ramp are the responsibility of the Permittee. The Permittee will not be responsible for AAB reciprocal ramp provision.
 - 1. When a pedestrian ramp is constructed a detectable warning panel must be installed in the ramp. The color of the detectable panel must be Seattle Yellow (Federal color 23594). When a pedestrian ramp is constructed within the South End Landmark District and Beacon Hill Landmark District, the detectable warning panel must have the color of Brick Red (Federal color 20109).
- F. On all excavated concrete sidewalks or driveways, regardless of length, a sufficiently compacted gravel sub-base shall be placed upon the sub-grade allowing for **a six (6) inch** concrete repair. Locations with a depth greater than **six (6) inches** must be replaced in kind to match the existing surrounding sidewalk.
- G. All concrete forms shall conform to the various subsections of Section 12.00 and the specifications listed below.
 - 1. The forms for Portland Concrete Cement (PCC) shall be smooth, free from warp, of sufficient strength to resist springing out of shape, and of a depth to conform to the thickness of the proposed walk.
 - 2. All mortar and dirt shall be completely removed from the forms that have been previously used.
 - 3. The forms shall be well staked, thoroughly braced, and set to the established lines with their upper edge conforming to the grade of the finished walk. The finished walk shall have sufficient pitch from the outside to the edge of the walk providing adequate surface drainage at a rate of ideally 1.5%, but no more than 2% cross-slope.
 - 4. Before concrete is placed for sidewalks and driveways the sub-grade shall be thoroughly dampened so that it is moist throughout, but without puddles of water.
 - 5. The concrete shall be placed as near to its final position as possible with precautions taken not to overwork the concrete while it is still fluid.
 - 6. The concrete shall be thoroughly spaded along the forms, or screeded to eliminate voids or honeycombs at the edges.
 - 7. All concrete slabs shall be thirty (30) feet in length and separated by one-quarter ($\frac{1}{4}$) inch preformed transverse expansion joints, unless otherwise directed by the BPWD. Preformed expansion joint filler shall be placed adjacent to or around existing structures and as directed by the BPWD.
 - 8. The concrete surface shall be uniformly scored into block units or areas not more than thirty-six (36) square feet to a minimum of one quarter ($\frac{1}{4}$) of the total depth of the slab. All edges and joints must be rounded.
 - 9. "Picture frames" and all other tool marks must be eliminated from the concrete.

- H. The concrete materials shall be mixed to produce a consistency where the water shall flush to the surface under heavy tamping. Revamping of the concrete shall not be permitted. The application of neat cement to the surface in order to hasten hardening is prohibited.
- I. Inspection and testing of cast-in-place concrete work shall be performed by, and at the discretion of, the BPWD. Such inspection and testing shall not relieve the Permittee of his responsibility to provide his own quality control as necessary to furnish materials and workmanship in accordance with requirements of these Rules and Specifications.
- J. The concrete shall be thoroughly consolidated in place over an approved sub-base. The concrete shall be not less than **six (6) inches** in depth for Portland Concrete Cement (PCC) sidewalks. Any depth greater than **six (6) inches** must be replaced in kind. The concrete shall be not less than **six (6) inches** in depth for PCC driveways.
- K. The PCC for sidewalks and driveways shall be worked and floated so as to give a smooth, uniform and attractive surface finish. In conveying the concrete from the place of mixing to the place of deposit, the operation must be conducted in such a manner that no mortar shall be lost, and the concrete must be handled so that the concrete remains of uniform composition exhibiting neither excess, nor lack of, mortar in any one place.
- L. The concrete surface shall be struck off to the required elevation and cross-section, followed by the roller, and then leveled with a bull float, or scrapes the minimum if necessary to remove irregularities.
- M. Adequate protection must be provided when temperatures of (40°F) forty degrees Fahrenheit or lower occur during the placing of concrete, and during the early curing period. The minimum temperature of fresh concrete after placement, and for the first three (3) days shall be maintained above (55°F) fifty-five degrees Fahrenheit. An additional three (3) days of protection from freezing shall be maintained if required.
- N. The Permittee shall make every effort to protect the newly poured concrete surface against vandalism, marking, or defacing and must stand ready to replace any blocks which, in the opinion of the BPWD, are excessively marked or defaced without any additional cost compensation to the Permittee from the City of Boston.
- O. Concrete shall be finished and shall conform to the various subsections of the specifications listed below.
 - 1. The finishing of the concrete surface shall be performed by experienced and competent cement finisher. Preformed one-quarter (1/4) inch expansion joint filler shall be used in the transverse expansion joints for a PCC sidewalk, and the joints shall conform to the requirements of AASHTO designation M-33, Type 2 liquid membrane-forming compounds for curing that shall be used in accordance with ASTM designation C-15 designation M148-57, or the latest revisions.
 - 2. Finishing operations shall be delayed until all bleed water and water sheen has left the surface and the concrete has begun to stiffen. All joints shall be round and cut to a minimum of one-quarter (1/4) of the concrete depth. Concrete shall be finished utilizing a steel trowel with all finishing to be done by hand. After tooling, the surface shall be brushed by drawing a soft-bristled push broom with a long handle over the surface of the concrete to produce a non-slip surface.
 - 3. Type 2 pigmented liquid membrane-forming curing compound shall be applied immediately following final finishing, and before any marked dehydration of the concrete or surface checking occurs. The compound shall be applied in one or two applications as directed by the BPWD.
 - 4. When the compound is applied in two applications the second shall follow the first within thirty (30) minutes. The compound shall be applied in a continuous film by means of power-operated pressure spraying equipment at a rate not less than one (1) gallon per two-hundred (200) square feet of surface. Sufficient pressure shall be applied to the spray machine to force the compound to leave the nozzle as a fine spray.
 - 5. The material shall adhere to the surface and make a tight bond with the concrete, but shall have a fugitive dye. The compound shall form a uniform, continuous coherent film that shall not check, crack, or peel and shall be free from pinholes or any other imperfections.

6. Whenever the temperature is (90°F) ninety degrees Fahrenheit or more, the BPWD shall have the right to require a second application of compound at no additional expense to the City of Boston. Any section damaged by rain, or in any other way, before the compound has dried to a stable coating shall be retreated by the contractor at no additional expense to the City of Boston.
7. The concrete surface to which compound has been applied shall be protected for a period of at least three (3) days. All vehicular and pedestrian traffic shall be considered detrimental to the film of applied compound and shall be prohibited. Any damage to the film in the three (3) day period shall be promptly repaired by reapplication of the compound at no additional cost to the City of Boston.

Sec. 12.05 Materials: Brick Sidewalks

- A. New Brick shall conform to the Boston Public Works Construction Management Division specifications.
 1. All bricks shall be for exterior horizontal paving and wire cut type.
 2. All bricks shall be delivered to the site on pallets in packages with wax surfaces protected by paper separators or facing each other. Waxed bricks shall be stored in a location protected from the sun.
- B. All materials shall be delivered, stored, and handled to protect them from wetting, staining, snipping, or other damage. Cement and similar perishable materials shall be stored in watertight sheds with elevated floors. Bricks shall be stored off the ground and under watertight covers. Any material showing evidence of water or other damage shall be rejected by the BPWD.
- C. Prior to ordering materials the Permittee shall submit for BPWD approval samples of brick and masonry accessories. Samples of other materials to be used and samples for testing shall be submitted as requested by the BPWD. Bricks shall be submitted in whole straps or panels to show color range and texture. Before construction begins a sample panel of at least twenty-five (25) bricks shall be laid as a job site panel to be retained for reference until the project is accepted by the BPWD.
- D. Any bricks considered salvageable by the BPWD shall be carefully removed, cleaned and reused. New bricks shall be required to supplement missing and unsalvageable bricks. When the salvaged brick supply has been exhausted, new brick shall be required to complete the work and shall be installed in the same manner as the used brick. New and used brick shall be interspersed in so far as is practical.

Sec. 12.06 Edgestone

- A. When curb, circles or corners, are required to be set, reset, and raised to line and grade, sufficient, good, crushed stone shall be used and thoroughly rammed to bring it to the proper line and grade. Where it is necessary to lower the grade of edgestone, the edgestone shall be removed and reset to the proper line and grade on a foundation made of good crushed stone thoroughly rammed so that it shall be six (6) inches thick and the full width of the trench.
- B. When setting or resetting curb, the existing pavement and base shall be cut with a mechanical saw, compressor, or by some other method approved by the BPWD. The existing pavement and base shall be cut in a straight line running parallel to and a distance of eighteen (18) inches from the final location of the curb. The Contractor shall set the curb on the crushed stone foundation and backfill the roadway side of the trench with the required amount of gravel and a minimum of four (4) inches of cement concrete base up to the bottom of the proposed top course of bituminous concrete material. **All curb joints will be mortared from bottom to top both sides prior to backfilling curbing.**

Sec. 12.07 Methodology: Brick Sidewalk Restoration

- A. Brick & Masonry Specifications
 1. All masonry shall be laid by skilled workmen under adequate supervision, and shall be laid true to lines and levels referred to in these Rules and Specifications.

2. Masonry work on a cement concrete or bituminous concrete base shall not be laid in temperatures below (40°F) forty degrees Fahrenheit unless provisions are made to adequately protect the masonry materials and the finished work from frost by heating materials, enclosing the work, or heating the enclosed spaces and contact surfaces. All masonry materials used in freezing weather shall maintain a temperature between (50°F-90°F) fifty and ninety degrees Fahrenheit. The masonry shall be protected against freezing for a minimum of forty-eight (48) hours after being installed. Anti-Freezing admixtures shall not be allowed in the mortar. Frozen work shall not be built upon. Any completed work found to be affected by the frost must be taken apart and rebuilt at the Permittees expense.
3. The brick paving shall be installed to provide adequate drainage at all points. If any condition is encountered when drainage is questionable the Contractor shall notify the BPWD and suspend work until the BPWD responds. If the BPWD determines that the drainage on newly laid brick is inadequate, the area in question shall be taken apart and rebuilt at the Permittees expense.

B. Brick Sidewalk on Concrete Base with Mortar Joints

1. No new sidewalks are to be constructed on concrete base unless specifically authorized by the BPWD. All repairs to existing brick sidewalks on a concrete base must adhere to these specifications.
2. Coursing shall be laid out so that end conditions of bricks shall not have to be cut to a length of less than one-and-one-half (1½) inches. The bricks shall have a low rate of suction at the time they are laid. The brick shall not gain more than a maximum of (20g) twenty grams in weight when placed in one-eighth (¹/₈) inch of water for one (1) minute, and the slab shall be thoroughly saturated with water and the top surface of the slab shall be dry before starting to lay any bricks.
3. Concrete for base course shall conform to these Rules and Specifications, and to the requirements of M4.02.00 for Class C cement concrete.
4. The cement concrete base shall have a depth **six (6) inches** and shall be constructed on a gravel sub-base of not less than **six (6) inches** in depth. The cement concrete must be rough finished, uniform, parallel with, and three (3) inches below, the surface of the finished brick paved areas. Expansion joints in the slab shall be located as shown on the plans, or where directed by the BPWD. All joints shall be located no more than sixteen (16) linear feet apart and shall correspond to joints in the overlying brick paving.
5. After the excavation has been completed, the sub-base fine graded, the gravel sub-base placed, fine graded and compacted, the concrete base-slabs constructed, and before commencing the work of brick paving, the slabs shall be thoroughly cleaned of all dust, dirt, and foreign matter.
6. Masonry sand shall be clean, washed, and uniformly well graded. Masonry sand must conform to the requirements of ASTM Specification C-144-70 with the further requirement that the fineness modulus shall be maintained at 2.25 plus/minus 0.10. Sand shall be from a single source meeting these requirements and as approved by the BPWD after laboratory testing. The source of supply shall not be changed during the course of job without written consent of the BPWD.
7. All brick for sidewalks shall be placed in a one (1) inch bed of mortar. The mortar shall be placed on top of a concrete base, varying in thickness from three (3) to five (5) inches. The concrete base shall have a gravel sub-base, a minimum of **six (6) inches** in depth, adequately compacted and placed as described in these Rules and Regulations.
8. Bricks shall be laid with the un-sanded, waxed side up. The back of each pre-wetted brick shall be coated with a mixture of cement and Laticrete 13701 latex (Laticrete shall be mixed with water in a 1:1 ratio), or approved equal, and set the brick into the freshly installed mud setting bed, tamping the-brick level and true. Leveling of the brick should be done as the setting operation proceeds so that it is not necessary to disturb the bricks set earlier.
9. Mortar for all joints between bricks shall be mixed to a reasonably stiff consistency, and shall consist of one (1) part Portland cement and (two-and-a-half 2½) parts dry sand. To this there shall be added the latex bonding agent at the rate of not less than one (1) gallon to one (1) bag of Portland cement. The use of lime is prohibited. Mortar for exposed joints shall also contain the colorant herein specified, if colorant is required. The colorant shall not be used in excess of seven (7) percent by weight of cement.

- a. Colorant shall be of a type and quality that shall not adversely affect workability, setting, or strength of the bond and shall be compatible with the latex-bonding agent employed. The color shall be chemically inert, non-fading, alkali fast mineral oxides finely ground and specially prepared for use in cement mortar.
 - b. The latex-bonding agent shall be non-re-emulsifiable in the presence of moisture and shall contain less than 50% internally plasticized solids. It shall be similar and equal to Laticrete, and used in accordance with manufacturer's instructions. Laticrete 43701 is a grout and mortar admixture manufactured by Laticrete International, Woodbridge, Connecticut.
10. Grouting should not be applied for a minimum of twenty-four (24) hours, or until the under bed sets and hardens. All un-grouted brick areas shall be protected from pedestrian traffic.
 11. The Permittee shall be responsible for closing off all traffic to avoid damage to the area until the mortar has set.
 12. After the initial set of mortar, joints shall be finished by tooling with a one (1) inch diameter non-staining jointer (a hard maple jointer would be preferred) to produce a very slightly concave polished joint free from drying cracks. After installation, the joints shall be cured for at least five (5) days by covering with curing paper or other approved material. When the joints have been cured, the wax shall be removed with high-pressure steam. Care shall be taken not to damage mortar by overheating any area.
 13. All joints shall be solidly filled to the full depth with mortar, which has the colorant added if specified. Points shall be a nominal five-sixteenth ($\frac{5}{16}$) inch to three-eighth ($\frac{3}{8}$) inch wide. Proper care shall be taken not to place mortar on adjoining brick, cut stone, or any other surface.
 14. Joint sealer shall be one part moisture-cured, non-sag, polyurethane sealant which meets or exceeds Federal Specification TT-S00230c, Type II, Class A. Sealant shall be similar to Sikaflex-1a as manufactured by Sika Chemical Corp, Lyndhurst, NJ, or an approved equal.
 15. Compressible preformed joint filler shall be installed along the perimeter of brick paving and as directed by the BPWD. The filler shall be a resilient non-extruding closed-cell foam polyethylene, sponge rubber and of proper thickness to be three-eighths ($\frac{3}{8}$) inch thick under compression, and shall be kept one (1) inch below the top of the brick paving to allow for caulking. Compressible preformed joint filler must conform to AASHO-M153.65 Type II for Standard Cork Filler.
 16. All imperfect or frozen mortar joints shall be raked out to a depth of three-eighth ($\frac{3}{8}$) inch and reappointed as directed by the BPWD at the Permittees expense. The entire project must be left in perfect condition, clean and free from all blemishes.
 17. All bricks that require installation in a radial pattern shall be saw cut to have a uniform three-eighth ($\frac{3}{8}$) inch joint.

C. Brick Sidewalk on Bituminous Concrete Setting Bed

1. Bituminous concrete shall conform to these Specifications, and to ASTM D 946 penetration grade 85-100. All sand shall be clean, hard sand with durable particles uniformly graded from coarse to fine, and all passing the No. 4 sieve and conforming to ASTM C 144. The asphalt cement and sand shall be mixed at an asphalt plant in the proportion of seven (7) percent asphalt cement and ninety-three (93) percent sand. The mix shall be heated to 300 degrees Fahrenheit.
2. The bituminous concrete base shall have a depth of three (3) to five (5) inches as directed by the BPWD, and shall be constructed on a gravel sub-base. The bituminous concrete must be rough finished, uniform, parallel with, and three (3) inches below, the surface of the finished brick paved areas.
3. The top course of bituminous concrete shall be swept clean before installation of any brick. Three-quarter ($\frac{3}{4}$) inch bars shall be set, with shims as necessary, to the proper grade. A sand asphalt mixture shall be spread with a striking board pulled over the control bars several times. Fresh sand asphalt shall be applied over low spots until a smooth, firm and even setting bed is achieved. The area shall be rolled while still hot with a light steel roller to the required final surface depth.

4. A mastic adhesive shall be required, and shall consist of two (2) percent neoprene (grade WM1) oxidized asphalt with 155 degrees Fahrenheit softening point (80% penetration) and ten (10) percent long fibered material.
 - a. Paver Mastic must be applied to a surface free of all foreign matter to a maximum one-sixteenth ($\frac{1}{16}$) of an inch skim coating with a straight-edge trowel or squeegee. Paver Mastic must be allowed to flash off but not dry before embedding pavers.
 - b. Paver Mastic should yield a coverage rate of thirty (30) to fifty (50) square feet per gallon. For best results the temperature is recommended to be above seventy (70) degrees Fahrenheit.
 - c. Cold temperatures will increase the viscosity of the paver mastic. Care must be taken while troweling the product to make sure a proper one sixteenth ($\frac{1}{16}$) of an inch skim coat is maintained. This may require the product to be brought to a more ambient temperature, making the Paver Mastic more pliable.
5. If any settlement occurs that produces a mismatch of one sixteenth ($\frac{1}{16}$) of an inch at the interface between brick pavements and other pavements prior to final acceptance, bricks shall be relayed near the interface to provide a smooth transition between the brick and adjacent surfaces.
6. Any joints between bricks shall be filled with a four to one (4:1) sand to cement mix swept into said joints until completely filled. The joints shall be lightly fogged with water to compact the mix into the joints. This process shall be repeated until all joints are compacted and filled.
7. If the continuity of the work is suspended, the Permittee shall terminate his paving against temporary wood blocking. The bricks along this blocking shall be set in sand so as to allow removal and tooting of the bricks in the work to be later continued. All exposed brick surfaces shall be thoroughly cleaned with a solution of soap and water using stiff fiber brushes. In some cases the area shall be wetted with a five (5) percent solution of muriatic (hydrochloric) acid, which shall be preceded and followed by a copious bath of fresh clean water.
8. All stains shall be cleaned immediately with a high pressure washer.

D. New Brick Sidewalk on Stone Dust Setting Bed

1. The sub-base shall be compacted and prepared parallel to, and compacted to, two (2) inches at a minimum, plus the thickness of a brick below the finished surface.
2. A layer of stone dust, a minimum of two (2) inches in depth, shall be spread on the properly compacted sub-base. Special care shall be taken to make the surface of the stone dust parallel to the finished grade of the sidewalk. The stone dust shall be rolled, tamped, and sprinkled with water to form a compacted layer of sufficient thickness, two (2) inch minimum, to bring the bricks to the proper grade and slope when rammed firm.
3. Stone dust shall consist of inert materials that are hard, durable stone free from surface coating and deleterious materials. Graduation requirements shall be as follows:

<u>SIZE OF SIEVE</u>	<u>MINIMUM PERCENT PASSED BY WEIGHT</u>
#4	100
#8	96
#16	68
#30	43
#50	29
#100	17
#200	11

4. The cracks shall be laid to match the existing brick pattern with hand-tight butt-prints. A plank covering several courses shall be placed upon the bricks and carefully rammed with a heavy rammer until the bricks reach a firm, unyielding bed, and present a surface at the proper grade and slope. Any divergence from line and grade is to be corrected by removing and relaying the bricks.

5. After bricks are rammed in place, stone dust shall be swept into all joints until they are completely filled and then a light fog of water shall be applied to the entire area. This process shall be repeated a minimum of three (3) times, or until joints are compacted and full. All surplus stone dust remaining on the sidewalk shall be removed carefully by sweeping. Care shall be taken to avoid raking out the joints during the removal of the stone dust. All fitted pieces of brick shall be saw-cut no smaller than two (2) inches wide by three (3) inches long.

Sec. 12.08 Special Conditions

A. Tree pits

1. Work around and adjacent to existing trees shall be done exercising special care where roots are present. Excavation around roots of trees to remain shall be done entirely by hand.
2. Roots over one (1) inch in diameter shall be cut neatly and left unpainted. Exposed roots shall not be left to the heat of the sun or freeze in the cold but shall be promptly covered and protected. In no case shall more than one third ($\frac{1}{3}$) of the total root structure be disturbed or cut without approval of an Arborist.
3. When a tree pit is encountered within the limits of work, the Contractor shall construct a new tree pit that is a minimum twenty-four (24) square feet while keeping the minimum three (3) feet walking path.

B. Sign posts

4. All sign posts that are within the limits of work shall be reset and erected in a concrete base no more than eighteen (18) inches from the face of the curb. Sign posts must be installed to BTM and MUTCD specifications.
5. Any post that is damaged due to the Contractor's operations shall be repaired or replaced at the Contractor's expense.

C. Street Lighting and Transportation Pull Boxes Covers

1. If a City of Boston Street Lighting Pull Box or a Boston Transportation Pull Box is located within the limits of work, the Permittee is required to remove and dispose of the existing frame and cover and replace with a new composite frame and cover. The new frame and cover must meet the BPWD and BTM specifications prior to the installation.
2. The new composite frame and cover shall be set so that the top of the frame will be at grade with the sidewalks when complete.

D. Any loam brought to the work site to repair damaged grass areas must conform to MassDOT Standard Specification Section M.1.07.0 "Topsoil and Plantable Soil Borrow". Loam shall have a minimum finished depth of six (6) inches

E. Seeding shall conform to MassDOT Standard Specification Section M.6.03 or as required by the BPWD. Permittees shall be required to continually seed areas of loam with seed until a satisfactory growth of grass is established as determined by the BPWD.

F. If subsequent testing on hardened concrete by the owner shows that the concrete does not meet the specification requirements, the contractor shall, in addition to being responsible to replace any material or workmanship which is rejected, shall also be responsible for the cost of the testing.

SECTION 13.00

WINTER MORATORIUM

Excavations into paved areas will not be approved during the Winter Moratorium period, **November 15th through April 15th**, unless otherwise authorized by the BPWD. In the event that winter weather conditions have not yet set in, and HMA is available for pavement repair, the BPWD may on a case-by-case basis allow conditional permits to be granted. The BPWD reserves the right to revoke such permits as weather or HMA availability conditions warrant.

A copy of Winter Moratorium Guidelines can be obtained at:

<http://www.cityofboston.gov/publicworks/construction/>

- A. Nothing in this section shall be construed to limit ability to address emergency situations. If a paved area excavation occurs due to an emergency, documentation of that emergency is required to be submitted with the next days permit application.
- B. Weather and site conditions that must exist before granting a Permit during the Winter Moratorium include, but are not limited to the following:
 - 1. Paving surface temperature in the shade of 40°F (degrees Fahrenheit) and rising during daytime hours.
 - 2. No measurable snowfall anticipated prior to scheduled pavement restoration.
 - 3. Frost shall not exist below the surface of a paved area.
- C. All Permittees are required to be able to mobilize and be on site to protect their work zone within one (1) hour of being made aware of a public safety issue associated to their work.

A work crew should begin making all necessary repairs to provide a safe work zone within three (3) hours of notification.

- D. The following specifications shall apply when work is conducted in a paved area during the Winter Moratorium:
 - 1. Every Wednesday and Thursday at 9:30am the Moratorium Board shall meet in room 714 at Boston City Hall where the Permittee may present a written request for a waiver to the Winter Moratorium. The Moratorium Board shall determine if this request is approved or denied on a case-by-case basis.
 - 2. New permit requests after November 15th must be presented to the Winter Moratorium Board which meets every Wednesday for utility companies at 9:30am, and every Thursday for private contractors at 9:30am in room 714 at Boston City Hall. Requests must include a hardship letter explaining, in detail, the scope of the work; the approximate time to complete the work; and legitimate reasons as to why the work cannot wait until the end of the Moratorium period

The Board will not accept permit requests if it is determined that the work was regularly scheduled maintenance, and/or service request work, but was delayed or not performed by the Permittee for insufficient reasons during its normal construction season, April 15th through November 15th.

Emergencies activated by your company must be for emergency purposes only. Any emergency work determined by the BPWD or its representative to be for normal work purposes and not a true emergency, the BPWD will suspend all of that Permittee's active work, no new permits shall be issued, and the Permittee will be required to meet with the Commissioners of both Public Works and Transportation with a representative of the Mayor's office to discuss this abuse.

3. The Permittee will be responsible for snow plowing and snow removal of the work zone as delineated by the City during construction.

Forecasts for snow will require your company to immediately secure your job site by backfilling and paving your work zone.

If, for some unforeseen reason, your company is incapable of backfilling and temporarily paving the excavated location, your company must contact the BPWD with a detailed explanation as to the reasons the plates must remain.

No Permittee will be allowed to continue construction on their work site(s) after a citywide snow alert shutdown until authorization has been granted by both the BPWD and BTM

4. Permits granted during the Winter Moratorium may be required to use Controlled Density Fill (CDF) as directed by the Commissioner. CDF shall be heated when the temperature is below 20°F (degrees Fahrenheit). CDF shall conform to the Commonwealth of Massachusetts Department of Public Works standard specification "MASSDOT M4.08.0 Controlled Density Fill", Type 1E or 2E Excavatable mixtures.

E. Winter Moratorium Steel Plate Procedures

1. If steel plates are necessary the BPWD and the CIU must be notified of their locations. To notify the BPWD a Plate Notification form must be faxed to 617-635-7605. A follow-up call must be made to the BPWD at 617-635-7560. To notify the CIU a fax must be sent to 617-635-7498. A follow-up call must be made to the CIU at 617-635-4950. Failure to notify the BPWD and CIU may result in suspension of all non-emergency permits. The fax notification form can be found in Appendix B of these Rules and Specifications.
2. All steel plates utilized during the Winter Moratorium must be coated with a skid-resistant material unless otherwise authorized by the BPWD.
3. All steel plates utilized during the Winter Moratorium must be recessed to grade of the roadway. If a plate cannot be recessed as a result of existing roadway conditions the Permittee must provide a detailed explanation on the fax notification form on Appendix B.

A poorly recessed plate will sit below grade resulting in the plate banging, lifting up and down creating a tremendous hazard as traffic travels over the plates(s).

A Permittee who displays poor practices when securing plates will forfeit the privilege of using plates within the City during the Winter Moratorium. If a Permittee forfeits their privilege to plate due to poor construction practices all locations are required to be backfilled and paved everyday during construction activity, or otherwise the Permittee must terminate all activity on the site.

The recommended method to ensure a recessed plate stays to grade is to make the recessing excavation deeper than the actual depth of the plate. A leveling course of HMA is installed to bring the plate back up to grade.

4. All plated locations must have a "Caution: Steel Plates Ahead" sign(s) constructed with Retro Reflective Florescent Orange material (Type 4) bracketed to a pole six (6) feet in height or greater. Depending on the size of the pole and existing signage the PWD may allow the sign to be positioned below the 6 foot requirement.

Signs must be posted 200-300 feet in advance of steel roadway plates being used, or as otherwise directed by the BPWD.

If plates span across the centerline of a two way street a sign must be placed on both sides of the street approaching the steel plate(s). Depending on the location, including approaching streets, the City may require the use of more signs being posted as directed by the BPWD.

5. All steel plates to be installed must have the Permittee's name and 24 hour contact number on both sides of the plate. Initials will not be allowed to identify plates. The full name of your company, or the contractor working for you, must be clearly displayed on each and every plate.

Rental plates must also have the full name and emergency phone number of the party that is responsible for the safety of the plate. This is solely your responsibility, and an immediate solution should be devised without input from the BPWD

6. All steel plates installed must have a minimum of eighteen (18) inch overlap of the excavation. Depending on the sidewall conditions the plates may need to be extended beyond the 18" to ensure public safety.

F. Winter Backfill Requirements

1. The Permittee is required to supply new processed gravel, or recycled gravel that has been certified by the CIU. The source of gravel used for backfill must be protected from freezing using acceptable standard industry practices.
2. All lifts must be compacted in six (6) inch loose layers to 95% of maximum dry density unless otherwise approved by the BPWD. Equipment that allows backfilling over the six (6) inch lift requirement must be certified and approved by the CIU.

G. Winter Paving Requirements

1. Temporary pavement repair must be Hot-Mixed Asphalt, unless hot-mix material is documented to be unavailable within a seventy-five (75) mile radius of the City of Boston. If hot mix asphalt is unavailable the Permittee must use Modified Winter Patching Material as specified in Appendix A.
2. The Permittee is required to supply three (3) inches of hot-mix asphalt in two (2) even, compacted lifts. Cold patch will only be allowed when asphalt plants are closed, but must be replaced with hot mix asphalt immediately when the plant reopens.
3. All excavations prepared for paving shall be rectangular, unless otherwise agreed to by the BPWD. All irregular shaped cuts or damaged pavement shall be repaired at the expense of the Permittee. All paving shall be uniform, smooth and level to the adjacent surface with a Utility Repair Tag installed in every patch or trench as specified in Section 10.05.
4. The Permittee is required to maintain to the satisfaction of the BPWD any trench with Modified Winter Patching Material until hot mix asphalt is available. When hot mix asphalt becomes available the Permittee is required to remove all Modified Winter Patching Material and perform the Temporary Repair as described in Section 10.00. Hot mix asphalt materials may require a transport device to ensure proper placement temperature and integrity of the asphalt placed during cold weather.

H. Winter Inspection Requirements

1. Permittees must inspect all permits issued during the Winter Moratorium requiring street cut excavation work fourteen (14) days after the work has been completed and report back in an email to the BPWD Construction Management Division that the patch or trench is still smooth and level, or with a repair date to address any settlement.
2. All Permittees will perform a post-inspection survey thirty (30) days after the initial fourteen (14) day inspection takes place to verify their patches/trenches are still smooth and level. All inspection findings must be supplied to the BPWD Construction Management Division via email.
3. Major utility companies are required to summarize their fourteen (14) and thirty (30) day findings in a weekly report. This will eliminate individual emails for companies with multiple locations.
4. A failure to submit the required fourteen (14) and thirty (30) day inspection findings to the BPWD Construction Management Division will result in the suspension of all active work sites and no issuance of new permits during the Winter Moratorium Period.

I. Unacceptable Patch or trench Repair Procedures

- Unacceptable Patches/Trenches Needing Immediate Attention -
 - a. When the City contacts your company regarding a patch or trench that has settled to the point where it creates a jarring ride but is not a public safety issue, the City expects that the HMA patch repairs will be made within twenty-four (24) hours of notification.
 - b. We will accept a temporary repair in cold patch or sylvex until HMA is available. The City expects the HMA repair within twenty-four (24) hours of asphalt plants opening.
- Other Unacceptable Patches/Trenches -
 - a. When the City contacts your company regarding an unacceptable patch or trench that the City feels needs to be repaired but is not a public safety issue and does not greatly affect traffic, the City expects that the HMA patch repairs will be made within seventy-two (72) hours of notification.
 - b. We will accept a temporary repair in cold patch or sylvex until HMA is available. The City expects the HMA repair within forty-eight (48) hours of asphalt plants opening.

J. Winter Moratorium Addendum Cast Iron Structure Repair Procedures

Erosion of HMA Around Castings Repair Schedule

1. **Public Safety:** cast iron structures with erosion of a six (6) inch wide area or more adjacent to the casting of two (2) or more inches in depth.
 - a. Within three (3) hours of notification the utility must make temporary repairs of eroded area by patching with cold patch, HMA, or sylvex, unless otherwise authorized by the Public Works Department.
 - b. Within fourteen (14) days of the temporary repair, or at earliest availability of HMA, the Permittee will be required to cut-out around the casting, reset the structure if below grade, and place a permanent hot top repair, unless otherwise authorized by the Public Works Department.
2. **Non Public Safety:** minor erosion around the casting.
 - a. Within two (2) business days of notification that utility will make repairs to eroded area by patching erosion with cold patch, HMA, or sylvex, unless otherwise approved by BPWD.
 - b. Within fourteen (14) days, or at earliest availability of HMA, the Permittee will be required to cut-out around the casting, reset the structure if below grade, and place a permanent hot top repair, unless otherwise approved by BPWD.

Cast Iron Structure Grade Adjustment

1. **Public Safety:** two (2) or more inches of settlement of cast iron structure below street grade.
 - a. Cast iron structures settled two (2) or more inches must be reset to grade of the roadway within, forty-eight (48) hours, unless otherwise authorized by the Public Works Department.
 - b. The BPWD may require the Permittee to temporarily place cold patch, HMA, or sylvex over the cast iron structure within three (3) hours of notification to bring the area to street grade until permanent repairs can be scheduled in order to address public safety issues.
2. **Non Public Safety:** less than two (2) inches of settlement.
 - a. Within thirty (30) days of notification the Permittee will raise the casting to street grade, unless otherwise approved by BPWD.

- b. Depending on the volume of cast iron infrastructure needing repair or replacement the City may extend its thirty (30) day repair requirement so long as the utility company is repairing or replacing its infrastructure at a rate acceptable to the City.
- F. The City may request that utility companies use alternate cast iron infrastructure or installation methodologies on a trial basis for cast iron replacement procedures as long as their infrastructure will not be compromised, and no public safety concern will be created. The City and utility company can then agree on an approved methodology for future installation procedures, unless otherwise approved by BPWD.

SECTION 14.00

QUALITY ASSURANCE PROTOCOL

Sec. 14.01 CIU Inspections

- A. The Commissioner will assign an Inspector, at the expense of the Permittee, to supervise the opening, occupancy, obstruction, construction, or use made under any issued Permit. The Inspector shall act as a representative for the BPWD and shall have the full cooperation of the Permittee to rectify any deficiencies observed during site visits. Failure to take action as requested by the Inspector, or hostile behavior exhibited towards the Inspector shall result in the revocation of the Permit.
- B. Inspections shall be scheduled based upon information provided by the Permittee as follows:
1. The Permittee is required to contact the BPWD at 617-635-4950 at least twenty-four (24) hours in advance of the start of work, backfilling, or paving operations. The BPWD shall have an operator available Monday through Friday from 9:00am until 5:00pm. After 5:00pm the Permittee can call 617-635-4950 to access voicemail. All required information can be left on voicemail. The BPWD requires the following information on all call ins:
 - i. Permit Number
 - ii. Location
 - iii. Type of Activity
 - Starting Excavation
 - Backfilling
 - Temporary Paving
 - iv. Date and Time of the Activity
 - v. Foreman Name and Phone Number
 2. Notification of the anticipated timing of the aforementioned activities must be acknowledged by the BPWD. Any notification delivered by email or facsimile must be followed up with a telephone conversation or email response to assure its proper and timely receipt.
 3. Permittees shall endeavor to make notification by 4:00pm on the day prior to their anticipated activity. In the event of schedule changes the Permittee shall notify the BPWD by 7:00 am on the day work was scheduled. In the event of emergencies the Permittee must provide a minimum of one-hour notification to assure inspection availability.
 4. If a BPWD inspector is unable to be on-site within thirty (30) minutes of the acknowledged anticipated start of construction the Permittee shall be allowed to commence construction in accordance with these Rules and Specifications.
- C. At all times the Permittee shall provide safe means of access to and from the worksite.
- D. Methods of inspection and testing shall be in conformance with industry standards, and may be conducted after final pavement is installed.
- E. Testing shall be conducted on a random basis to insure compliance with the BPWD Rules and Specifications. This testing may include procedures to confirm ride-ability, proper soils and pavement materials, depths, and compaction. All testing expenses shall be the responsibility of the Permittee.

Sec. 14.02 Unacceptable Patch & Trench Repair Requirements

- A. The Boston Public Works CIU shall inspect all repairs and notify the Permittee of any patch or trench location that does not meet the City's specifications for paving.
- All street-opening failures or unacceptable patch locations noted during inspections shall be replaced at the expense of the Permittee.
- B. Repair of unacceptable patches and trenches shall be subject to the following procedures:
1. Public Safety Repairs
 - All Permittees are required to be able to mobilize and be on site to protect their work zone within one (1) hour of being made aware of a public safety issue associated to their work.
 - A work crew should begin making all necessary repairs to provide a safe work zone within 3 hours of notification.
 2. Settlement greater than two (2) inches or where creating a jarring ride
 - When the City contacts your company regarding a patch or trench that has settled two (2) inches or more, or is creating a jarring ride, but is not a public safety issue, the City expects that the HMA patch repairs will be made within two (2) business days of notification unless otherwise authorized by the BPWD.
 - The BPWD will accept a temporary repair in cold patch or sylvex until HMA is available. The City expects the HMA repair within twenty-four (24) hours of asphalt plants opening.
 3. Settlement less than two (2) inches, not smooth & level, not cut squared, material not acceptable and bar holes not filled
 - The repair must take place within seven (7) to thirteen (13) days of notification unless otherwise authorized by the BPWD. Once the repair has been made the CIU must be notified to perform inspection.
 4. Sidewalks left in HMA over 60 days
 - The BPWD will periodically send a list of all temporary sidewalk locations where Permittees are overdue to perform permanent sidewalk restoration. Permittees have seven (7) days to respond, and thirty (30) days to complete the permanent repairs. Failure to complete repairs may result in the denial of new permit requests.
 - If the City permanently restores a sidewalk left in HMA after the Permittee fails to perform the necessary repairs, the Permittee will be billed for the restoration cost with an additional 15% service fee.
 5. Specialty Crosswalks or Sidewalks left in HMA over 60 days
 - On specialty sidewalk locations identified as being left in HMA over sixty (60) days during the Construction Season your company must permanently restore these locations within fourteen (14) days of notification, unless otherwise authorized by the PWD.
 6. Notification of Repairs
 - The Permittee will be required to email or call the BTM and PWD forty-eight (48) hours prior to excavation and repair of unacceptable patch or trench locations. Depending on the situation, and only where approved by both BTM and PWD, the City may agree to allow notifications to be made by no later than 8:00am on the day of the repair.
 - The Permittee must email the Construction Management Division each week with a list of all completed repairs. The CIU will then be assigned to review the repairs and verify they meet City specifications for paving.

7. Contested Unacceptable Patches/Trenches

- Locations whose ownership or compliance is contested by the Permittee shall result in the completion date being put on hold until a site meeting can be scheduled to resolve the matter. If the CIU determines that the Permittee is contesting the location to delay accepting responsibility, a Violation will be issued and no site meeting will be held.

8. Violations

- Permittee notified of unacceptable patch or trench work must respond within two (2) business days by email or phone to verify ownership, agreeing that the location is out of compliance with BPWD paving specifications.
- Upon acceptance by the Permittee, a violation will be issued for that unacceptable repair. Failure to respond within two (2) business days will not extend the required completion date and an automatic violation will be issued.

9. Unacceptable Patches/Trenches Not Repaired within Required Time Specified

- A failure to complete repairs on unacceptable patches/trenches identified by the CIU within the time period required by the PWD will result in the hold on issuance for new permits, with the possibility of suspending all active work sites citywide, and a meeting will be scheduled in City Hall to discuss your company's construction practices.
- The City reserves the right at any time to extend the required repair period on unacceptable patches if your company demonstrates significant effort to comply with the BPWD repair schedule and the BPWD mutually agrees with your company for a time extension request.

BAD PATCH RESPONSE PROCEDURES

Bad Patch Type	Response Time
Public Safety (Shifted Plate, Patch Down 6", etc...)	Protect site within 1 hour ; Mobilize crew for repair within 3 hours
2" or Greater Settled	Must repair within 2 business days of notification
Less than 2" settled	Within 7-13 Days of notification
Permanent Sidewalk Repair	Return to existing within 60 days after initial repair
Pavement Marking/Loop Detectors	Within 3 days of notification

Sec. 14.03 Permittee Report Card

- A. Inspectors shall complete a field report for each street opening site visit. If at any time during construction the Permittee is found to be in violation of these Rules and Specifications the Inspector shall document and issue a violation to the Permittee.
- B. Inspections are performed using a standardized multi-item report which evaluates key construction items based on the Public Works Department Rules and Specifications. The items address the conventional process of street excavation as well as monitor permit restrictions and safety of the jobsite. Inspections are made throughout the life of the job. Some inspection items may not be relevant during any particular site visit.
- C. Information gathered by the Construction Inspection Unit's daily field reports are compiled and tabulated. Inspections are stored in a utility performance database maintained by the Boston Public Works Department, and are utilized to calculate various statistics pertaining to each Permittee.
- D. The database generates an overall compliance rating to qualify the performance of companies working in the public way. This rating is displayed in an individual report card available for each Permittee working in the city. The report card compares the Permittee's rating with the overall citywide compliance ratings.

Noncompliance Rating Percentage = $\left(\frac{\text{SUM OF VIOLATIONS}}{\text{SUM OF INSPECTION ITEMS}} \right)$	<u>Rating Scale %</u>
	100 ≤ GOOD ≤ 99.33
	99.33 ≤ FAIR < 98.65
	98.65 ≤ NEEDS IMPROVEMENT < 98 98 ≤ POOR

- E. All major utilities will be provided a regular report card of their construction practices. A summary report card will be sent to the Permittee at the end of each month, and calendar year.
- F. The report card is intended to be utilized as a valuable construction tool for each Permittee when analyzing and self evaluating both the strong and the weak points in their construction practices.

Sec. 14.04 Permittee Worksite Shutdown and Meeting Protocol

- A. The BPWD enforces a strict zero tolerance policy in regard to any violation(s) of individual worksite(s) within the City of Boston. Cited violations may result in an immediate shutdown and a meeting on construction practices will be attended at City Hall before work is allowed to continue. The City's expectation is that the worksite will comply immediately after this meeting, and that the Rules and Specifications will then be followed for the duration of the job.
- B. Any permit issued by the BPWD is revocable immediately upon written notification to the Permittee. Any person, firm, or corporation who violates any of the regulations of this manual shall be guilty of a misdemeanor, and upon conviction thereof shall be fined not less than \$300.00. A violation shall be issued for each day a worksite remains in violation and is subject to a fine of not less than \$300.00 for each issued offense. If the work or any part thereof mentioned in the permit is unskillfully or improperly done, the BPWD shall make any necessary repairs and shall keep an account of the expense thereof. The Permittee responsible for said work shall pay the BPWD an amount equal to the whole of said expense incurred by the BPWD as outlined in the various subsections of Section 3.00.
- C. The City of Boston reserves the right to suspend a utility or private contractor's privilege to work in the City for any number of days, to be determined by the Chief Engineer or their representative regarding any one of the following criteria:
 - Permittee's poor overall compliance rating
 - An elevated violation level of an individual inspection item (e.g. steel plates)
 - A Permittee's particular sub-contractor, supervisor, team leader, or foreman's unacceptable construction practices in any one (1) inspection item.
 - A single egregious violation.
 - Hostile or aggressive behavior toward City personnel or its representatives.

- D. If at any time the Permittee's practices become unacceptable, the Permittee shall be required to meet with the CIU to address their overall construction procedures in the City of Boston.
- E. If the Permittee fails to demonstrate an immediate appreciable level of improvement in their practices, all non-emergency permits will be suspended and a meeting will be held to review why the Permittee did not improve their overall construction practices, or an individual inspection item.
- F. If the Permittee continues to not show an appreciable level of improvement after the CIU suspension of non-emergency permits, all non-emergency permits shall be once again suspended. The Permittee's highest level of management will be required to meet with the Commissioners of Public Works and Transportation, and a Representative from the Mayor's Office to discuss the Permittee's construction practices.
- G. If a Permittee's particular sub-contractor, supervisor, team leader, or foreman's unacceptable construction practices in any one (1) inspection item result in three (3) shutdown meetings in one calendar year, all non-emergency permits will be suspended and the Permittee will be required to meet with the City of Boston to discuss their construction practices on the particular item they were in violation of.
- H. Utility companies with frequent violations for emergency repairs that fail to adhere to the City's specifications for paving will be required to meet with the CIU to discuss ways to improve the construction practices related to those repairs.

If a utility company shows no marked improvement after meeting with the CIU the BPWD reserves the right to require all emergency excavations ready to backfilled and paved during off hours (4:00pm – 7:30am Monday through Friday; all day Saturday & Sunday) be plated until a CIU inspector can be assigned to witness the back fill and paving operations during normal CIU working hours (Monday thru Friday 7:30 to 4:30 pm).

- I. Any violation, a failure to respond to any violation, or any hostile behavior by the Permittee towards the CIU or other City inspector may result in the suspension of all non-emergency permits. The Permittee shall be called to meet with the Commissioners of Public Works and Transportation to address the Permittee's construction activity in the City of Boston.
- J. Massachusetts General Law Chapter 82A, 520 CMR 14.03: "JACKIES LAW" gives authority for the City of Boston to revoke and/or suspend the granting of permits barring a public hearing with the City in response to violations made regarding Jackie's Law. All hearings under this section shall be held in accordance with G.L. c. 30A and 801 CMR 1.02, as outlined in Appendix G.
- K. The Permittee shall be held accountable for any violations made by their work crew.

Sec. 14.05 Constituent Relationship Management Work Order System

All CRM cases pertaining to work performed by your company must be prioritized for repair depending on the severity of the issue.

Constituent complaints regarding Permittee workmanship resulting in a Public Safety issue:

- **Roadway patches settled two (2) or more inches**
- **Sidewalk patches settled two (2) or more inches or above grade one (1) or more inches**
- **Erosion around castings two (2) or more inches in depth**
- **Castings settled two (2) or more inches**

The Permittee responsible for the work has one (1) business day to respond to both the Constituent and the BPWD indicating that they have been made aware of the case and will address the identified issue.

The Permittee responsible for the work has two (2) business days to assign a crew and make all necessary repairs.

Constituent complaints regarding Permittee workmanship, non-Public Safety related:

- **Roadway or Sidewalk patches not smooth and level**
- **Castings settled less than two (2) inches**
- **Sidewalks not permanently restored**
- **Lane markings or loop detectors not replaced**

The Permittee responsible for the work has two (2) business days to respond to both the Constituent and the BPWD indicating that they have been made aware of the case and will address the identified issue.

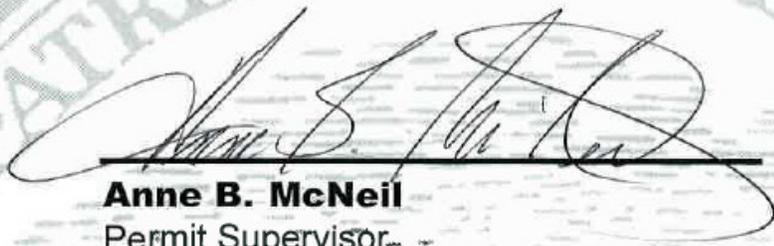
Depending on the severity of the issue the Permittee responsible for the work will have no more than thirteen (13) days to assign a crew and make all necessary repairs where necessary, as determined by the City.

Constituent complaints regarding general Permittee work zone concerns:

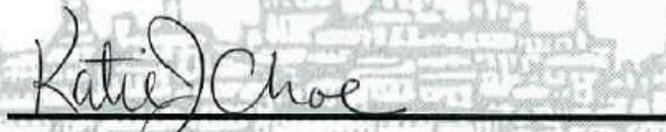
- **Posting**
- **Leafleting**
- **Work hours**
- **Noise**
- **Dust control**
- **Stockpiling**
- **Damage to property**
- **Unacceptable crew behavior**

The Permittee responsible for the work has one (1) business day to respond to both the Constituent and the BPWD indicating that they have been made aware of the case and will address the identified issue.

The City reserves the right to require other activities not listed above to be addressed using the above guidelines.



Anne B. McNeil
Permit Supervisor -
Permit Branch



Katie Choe
Chief Engineer
Construction Management Division



Michael Dennehy
Interim Commissioner
Public Works Department

April 6, 2015

APPENDIX A - MODIFIED WINTER PATCHING MATERIAL

1.0 DESCRIPTION:

This material shall be a plant-mixed pavement patching material capable of being stored in a stockpile composed of mineral aggregates and a modified bituminous material, and approved by BPWD. The mix provided shall meet the gradation contained herein.

Material shall be provided in accordance with the standard specifications for Cold Patching within the state or local jurisdiction, except as modified herein.

The material shall be uniform, workable, coated, and free of contaminants, debris, or ice and have a wet, shiny visual appearance at the time of delivery.

2.0 MATERIALS:

A. Aggregates: Aggregates shall conform to AASHTO M43 (aggregate size designation) modified as shown below and in accordance with ASTM C-136 for standard test method.

Sieve	Open Graded #9 Stone % Passing	Open Graded #89 Stone % Passing
1/2" (12.5mm)	100	100
3/8" (9.50mm)	100	90-100
#4 (4.75mm)	85-100	20-55
#8 (2.36mm)	10-40	5-30
#16 (1.18mm)	0-10	0-10
#30 (0.60mm)	0-7	0-7
#50 (0.30mm)	0-5	0-5
#200 (0.075mm)	0-2.5	0-2.5

ASTM C-88	Soundness Loss (Sodium – 5 cycles)	12.0% Max.
ASTM C-131	Los Angeles Abrasion Loss	40.0% Max.
ASTM C-127, 128	Absorption	0.5% - 2.0%
ASTM C-127-128	Specific Gravity	2.45% - 2.80%
ASTM C-123	Deleterious Material soft pieces	3.0% Max.
ASTM C-295	Deleterious Material Coal & Lignite	1.0% Max.
ASTM C-142	Deleterious Material Shale/Chirt/etc.	2.5% Max.

- B. Bituminous Material: The bituminous material shall be either UPM Liquid Asphalt Blend (Unique Paving Materials-Cleveland, Ohio 1-800-441-4880), or an approval equal. The material must be prepared from a base asphalt stock meeting the following requirements:

ASTM D-1310	Flash Point (TOC) 94 °C (200 °F) min.
ASTM D-2170	Kinematic Viscosity @ 60 °C (140 °F) 400-650
ASTM D-95	Water: 0.2% Max.
ASTM D-402	Distillate Test (Volume of original sample)
	To 225 °C (437 °F): None
	To 260 °C (500 °F): None
	To 315 °C (600 °F): 0-18%
	Residue from Distillate at 360 °C (680 °F): 72-95%
Tests on Residue:	
ASTM D-2171	Abs. Viscosity at 60 °C (140 °F): 125-425 Poises
ASTM D-5*	Penetration: 180 min. (using cone method)*
ASTM D-113	Ductility at 4 °C (39 °F) 1cm/min: 100 min.
ASTM D-2042	Solubility in Trichloroethylene: 99% min.

* Same procedure as ASTM D-5 except using a penetration cone conforming to ASTM D-217 in lieu of the standard penetration needle. The total moving weight of the cone and attachments shall be 150g ± 0.1 grams. The transfer dish water level shall be lowered to less than the height of the sample followed by decanting water from the top of the sample before transferring from the bath to the electrometer.

The bituminous material shall be available in various grades so that one such grade shall enable a stockpile to remain pliable and workable at a temperature of -15 °F (-26 °C).

3.0 COMPOSITION OF MIXTURES:

The aggregate gradation and bituminous material quantities shall meet the requirements given in Table 1 below. The Job Mix Formula design computations and trial batch(es) tests shall be submitted to BPWD or their Engineer designate for review prior to shipment of material to any municipal location. As with the State and local specifications, information shall be supplied including aggregate gradations; aggregate type and sources of supply; bituminous material amount and type including any additives; and temperature ranges for the material preparation. Submission of the above design and test information shall be required each time a change is made in the production design, producer, aggregate type, or source.

**TABLE 1
COMPOSITION OF STOCKPILE PATCHING MATERIALS**

Sieve	Open Graded #9 Stone % Passing	Open Graded #89 Stone % Passing
1/2" (12.5mm)	100	100
3/8" (9.50mm)	100	90-100
#4 (4.75mm)	85-100	20-55
#8 (2.36mm)	10-40	5-30
#16 (1.18mm)	0-10	0-10
#30 (0.60mm)	0-7	0-7
#50 (0.30mm)	0-5	0-5
#200 (0.075mm)	0-2.5	0-2.5
Total Liquid	5.75-7.0	5.25-7.0

The Final Job Mix Formula Total Liquid Content, when received by BPWD, shall not vary more than 0.5% from the design content when tested in accordance with ASTM D2172 Method A (including the ash), or Method E. The master ranges given above in Table 1 shall govern over the final job mix design content and allowable variations. All aggregate percentages in the table are based on the total weight of aggregate. The bituminous material percentage is based on the total weight of the mix and shall include any additives.

The mixture, after obtaining field working temperature following mixing, shall meet the following requirements:

- A. *Stripping Test:* A sample for testing is to be obtained by removing a sample toward the top of the stockpile and at a one-foot depth, and removing a similar sample toward the bottom of the stockpile at least one foot up from the toe of the stockpile and one foot into the stockpile. The suitable size test sample of the plant mixed material shall be permitted to cure at normal laboratory temperature for at least 24 hours after which it shall be placed in a glass jar, fitted with a tight cover, and completely covered with distilled water. The jar and contents shall then be allowed to stand for a period of 24 hours at normal laboratory temperature (approximately 70 \pm F) (21 °C). The sample shall then be shaken vigorously for a period of 15 minutes. The water shall then be poured from the jar and the sample removed to a flat surface and is permitted to air dry after which it shall be visually examined for stripping of the bituminous film from the aggregate.

4.0 FIELD PERFORMANCE:

The mixture shall be capable of maintaining all of its performance features after remaining in an uncovered stockpile of 100 tons or more for up to (12) twelve months. The field performance, as specified in this Section, shall meet a minimum of 80% effectiveness. The mixture shall be capable of maintaining adhesive qualities in areas that are damp or wet at the time of placement, and shall not bleed (flush) when overlaid with bituminous concrete.

Provided an approved material was used in the application, and provided the mixture was stockpiled and applied in accordance with the manufacturer's recommendations, and municipal records can document the application date and locations as well as the method of placement, ambient temperature and weather, the following field performance criteria shall be used to measure the effectiveness of the patch material. A total of (20) twenty patches shall be used for the rating process; (10) ten each within two discrete areas from one another, preferably representing two different work crews. The rating of the patches for field performance may be undertaken by BPWD or their designate Engineer at any time, but a minimum of (2) two ratings shall be performed during each patch season.

- A. The in-place patch shall not ravel out. Raveling shall be measured in accordance with pavement management distress survey methods. Light raveling shall be acceptable, whereas heavy raveling shall be unacceptable.

RAVELLING: Raveling is the wearing away of the pavement material surface caused by the dislodging of aggregate particles; it shall be an indication of poor in-place patch adhesion performance. **LIGHT Raveling** is viewed as loose aggregate particles, coated or uncoated, existing on or near the patch and having a patch surface texture that exhibits a pitted surface texture. **HEAVY Raveling** shall be indicative of a loss of aggregate particles greater than two stone thicknesses in depth from the original placed surface normally taken from the elevation of the adjacent pavement surface.

- B. The in-place patch shall not distort. Distortion shall be measured in accordance with pavement management distress survey methods. Light distortion shall be acceptable, whereas medium or heavy distortion shall be unacceptable.

DISTORTION: Distortions are localized pavement material surface areas having elevations slightly lower or higher than those of the surrounding pavement. Distortions can cause discomfort and/or a safety hazard, and/or vehicle damage, requiring a reduction in speed for safety. **LIGHT Distortion** is

measured as having a deviation from the normal plane of the street less than or equal to (1") one inch. MEDIUM or HIGH Distortion is a measurement from the normal plane of the street that is in excess of (>1") one inch. Generally, distortion shall exist as a depression within the patch area, or a bump or shove of material at the downside of the patch to the traffic flow.

5.0 STOCKPILING AND HANDLING PROCEDURES:

Following production, the patch material should be allowed to cool to ambient temperature prior to field use by storing (24) twenty-four to (48) forty-eight hours in piles no greater than (6) six feet. Once ambient temperature levels are reached, the patch material can be mounded to meet local needs, being sure to avoid traveling on the patch material with loaders and trucks. The stockpile of patch should be placed on a clean, hard, paved surface preferably away from blowing dust. Avoid contamination from other sources. To take advantage of the solar heat effects the ideal stockpile is rectangular in shape with sloped sides and ends. The stockpiles are placed in southeasterly to northwesterly directions; this allows the operator work off the southeast face during the morning hours, providing additional workability at sub-zero temperatures. These modified patch material stockpiles form a thin protective crust after a few weeks. This crust plays an important role in the longevity of the stockpile. It should not be disturbed except for the portion that gets mixed in while loading trucks, which should be loaded if possible from the shorter rectangular end of the stockpile. Do not freshen or work the entire pile to disturb the protective crust. If moisture has penetrated the stockpile, subsequently freezes and creates visible ice crystals inside of the pile, the material should be placed inside overnight at a minimum temperature of 50°F (10°C). Material returning to the stockpile at the end of the day should be near the working face, followed by mixing with fresh material on a 50/50 basis during the next load out.

6.0 INSPECTION, TESTING AND ACCEPTANCE:

The Producer shall contact the municipal Highway Department office seventy-two (72) hours in advance to arrange for an inspector, or their designate, to oversee the preparation of mixtures. All submittals as required by this specification are to follow immediately after design/production of the material. If inspections have not been performed at the time of mixture preparation, samples from the stockpile shall be tested by BPWD to determine acceptability of the mixture prior to shipment to any municipal yard. Two (2) samples shall be lifted from each stockpile, one sample taken toward the top and twelve (12) inches inside the pile, while the second sample is to be taken twelve (12) inches off from the toe of the stockpile and (12") twelve inches inside the pile. The results of the two (2) tests shall be averaged and compared to the design Job Mix Formula. Performance evaluations shall be conducted randomly by BPWD and at the discretion of BPWD, but in no case less than two (2) such performance evaluations per patch season as given in Section 9 of this specification. The municipal inspector, or designate, shall follow and document the patch placement. A minimum of ten (10) documentations for each of two (2) separate working crews shall be considered for each initial performance evaluation. Follow-up condition evaluations may be conducted at any time after placement for up to twelve (12) months. Each follow-up condition evaluation shall be reported and submitted to the Highway Department. Less than eighty (80) percent effective performance at any time after the placement of the patching material shall be considered unacceptable when at least twenty (20) patches have been evaluated. In the event the material furnished does not meet the requirements of this specification (regardless of weather, test acceptability, method of repair or other conditions), suppliers shall reimburse BPWD at a replacement cost of \$110/ton of representative material purchased and placed. Such reimbursement shall be submitted to BPWD in the form of a cashier's check within twenty-eight (28) days from the date of written notification from BPWD. Remaining stockpiled material representative of the rejected patches shall be removed from the site(s) and replaced, in equal quantity, with new specification material at no cost to BPWD. The material shall be delivered to the location(s) designated by BPWD within fourteen (14) days from the date of written notification from BPWD.

The initial approval of a mixture, or the initial acceptance of material, shall in no way preclude further examination and testing if unsatisfactory results are achieved. The acceptance at any time shall not bar its future rejection.

APPENDIX B:

**BOSTON PUBLIC WORKS DEPARTMENT
WINTER PLATE NOTIFICATION FORM**

Please fax your Notification immediately to Frontage Road Highway Office at 617-635-7633 and the Construction Inspection Unit (CIU) by faxing to 617-635-7498

NEIGHBORHOOD	
HOUSE #	
STREET	
PERMIT NUMBER	
PERMITTEE NAME	
CONTRACTOR NAME	
DATE INSTALLED	
DATE TO BE REMOVED	
RECESSED OR BERMED	
IF BERMED STATE REASON	
ID NAME	
ID PHONE NUMBER	
TYPE OF WORK	
NUMBER OF PLATES	

NOTES



APPENDIX C:

Foreman's Check List

CITY OF BOSTON PUBLIC WORKS DEPARTMENT

RULES AND SPECIFICATIONS FOR EXCAVATION ACTIVITY WITHIN THE CITY OF BOSTON

2014 Edition

1. Current Permit Present

- Must have permit on job site at all times.
- The excavator/operator must have the Jackie's Law Permit on site at all times.
- Your company must call the PWD (617-635-4950) 24 hours before the start of any excavation, backfill, or paving operations.
- Crew must follow the BTM Traffic Management Approval form.

2. Abiding to Permit Restrictions

- Crew must have ground ID signs properly placed before work begins. 2 signs required for 2 way streets.
- Sidewalk closed signs must be placed at any time a sidewalk is obstructed.
- Sidewalk Closed signs must be placed at the nearest ramps on either end of the construction site.
- Crew must maintain BTM traffic requirements including 2-way traffic where applicable.
- The required number of police details must be on site before any construction activity can take place.
- No stockpiling is allowed unless previously authorized by BTM and written on the BTM Traffic Management form.
- The Crew must work within the hours specified by the BTM.

3. Safe Work Zone

- Work zone must be properly secured to restrict access to pedestrian and vehicular traffic before starting work.
- Work zone must have approved barricades surrounding excavation site, with proper cones, tape, and other devices delineating traffic.
- Work zone must be swept clean at the end of every shift.
- Any excavation five feet deep or greater or where sidewalls appear unstable must be properly shored.
- Open excavations must never be left unattended (Jackie's Law).

4. Suitable Reused & Recycled Gravel Material

- To use existing material, it must first be tested and approved by PWD Engineers.
- Crews must never use unapproved material.

5. Suitable New Gravel Material

- Source of all new gravel material meeting MassDOT 1.03.1 specifications must be approved by PWD.
- Crew is responsible for visual inspection of gravel from approved source to verify it meets City specifications.
- Material may not be wet, frozen, contain deleterious material, or contain stones greater than 3" diameter.

6. Compacted in 6" Maximum Lifts - The PWD considers this the most important event during your construction work!

- The crew must compact gravel material with no greater than 6 inch lifts when using standard backfill equipment.
- If using specialized backfill equipment you must first test the equipment and submit the testing results to PWD for approval.
 - No greater than 2 foot lifts for hoe packs.
- On standard backfill equipment, the crew must perform 5-7 passes for each 6 inch lift.

7. Controlled Density Fill (CDF)

- The use of CDF is not allowed unless your company has received written approval from the PWD.
- If the use of CDF is approved, the crew must wait a full 24 hours for the mix to set before continuing backfill and paving operations.
- When using CDF, 24 inches or more of approved backfill material must provide a barrier between the CDF and the HMA before paving.

❑ 8. Opening Secured

- **Never should any roadway or sidewalk excavation be left in gravel for any period of time.**
 - Absolutely no excavation should be left unattended at any point (Violation of Jackie's Law).
 - If an excavation cannot be backfilled due to complicated work, the site must be fully secured with either plates or continuous fencing.
 - When using steel plates to secure a work site the plates must overlap the excavation by not less than 18 inches on all sides.
 - Unless recessed, all plates must have a 24 inch berm of HMA or cold patch on all driven sides, and 18 inches on non driven sides.
 - All plates should be properly shimmed, pinned and welded where necessary to ensure no movement when driven over.
 - If plates must remain for three or more days, they must be recessed to the grade of the roadway.
 - Every steel plate used to secure an excavation must have the Permittee's name and emergency contact number stenciled on them.
 - If securing a roadway or sidewalk excavation with cold patch, the cold patch must be replaced with HMA within 48 hours.
-

❑ 9. Two 1-1/2" Lifts of Hot Mix Asphalt

- When patching a roadway or sidewalk the crew must place 2 even 1.5 inch lifts of approved HMA, each compacted with 5-7 passes.
 - The crew must leave at least 1.5 inches of space to allow the top course; otherwise the patch will not compact properly and will fail.
-

❑ 10. Final Paving Requirements

- The patch or trench must be cut rectangular or square in shape.
 - Pavement edges must be saw cut to a vertical face and cleaned of debris.
 - Tack coat must be applied to the sidewalls of the existing roadway to allow the new HMA to adhere properly when placed.
 - Utility Repair Tags must be installed during the final lift of HMA. The tag is compacted into the top course of the asphalt patch.
-

❑ 11. Roadway Satisfactory Complete

- All asphalt patches must be adjacent to, and smooth and level with, the existing roadway grade.
-

❑ 12. Temp Sidewalk Complete

- All temporary asphalt patches must be adjacent to, and smooth and level with, the existing sidewalk grade.
 - Sidewalk patches greater than 35 feet must meet all ADA/AAB specifications. Patches under 35 feet must meet existing conditions.
 - Utility Repair Tags must be installed in all asphalt sidewalk patches.
-

❑ 13. Permanent Sidewalk Complete

- Temporary sidewalk repairs must be permanently restored within 60 days.
 - The crew must monitor all concrete permanent repairs of sidewalks while setting to deter vandalism.
 - Permanent repairs greater than 35 feet must meet all ADA/AAB specifications. Repairs under 35 feet must meet existing conditions.
 - Sidewalks must have no greater than a 2% cross slope. 1.5% cross slope is preferred.
-

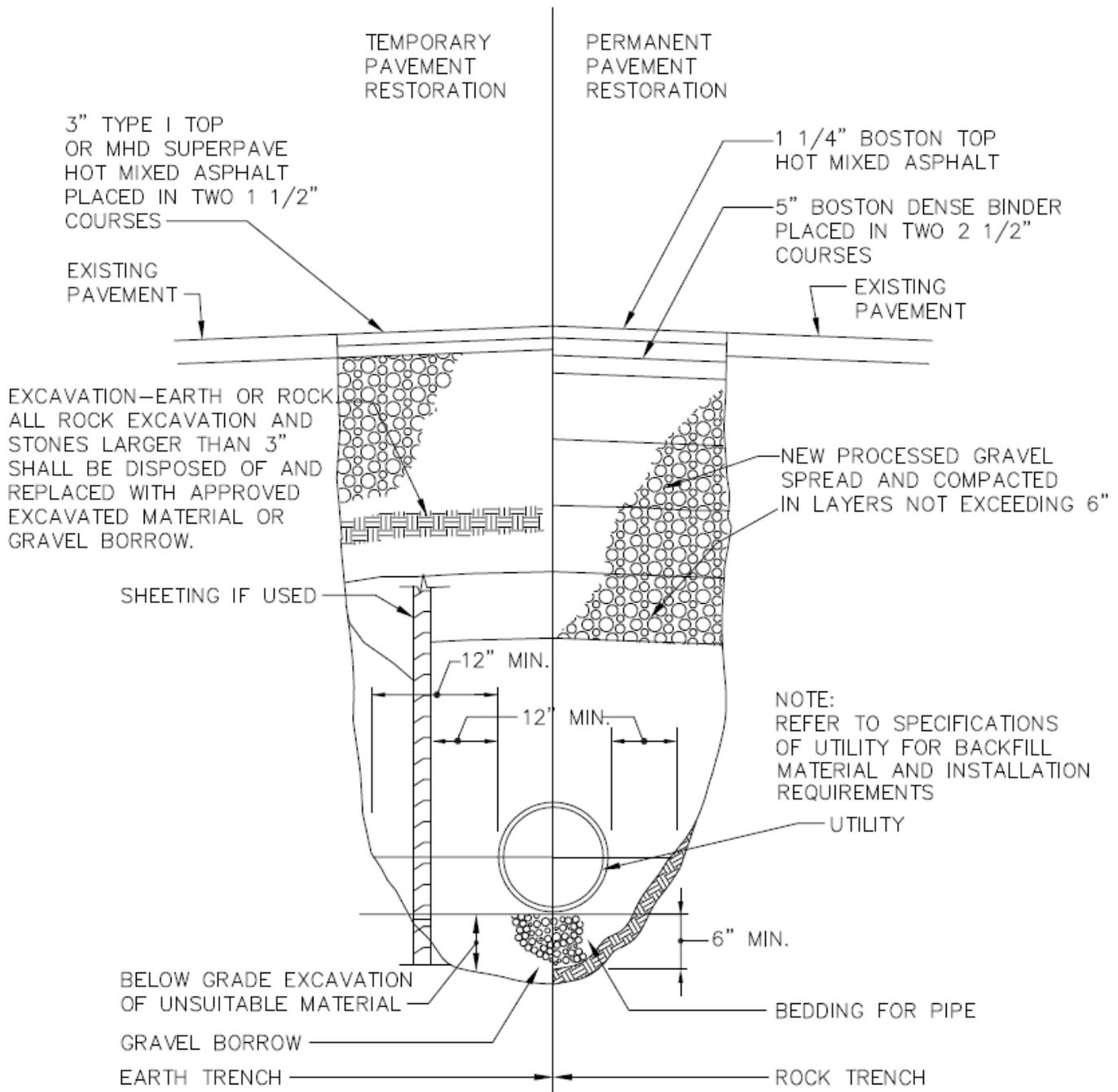
❑ 14. Pedestrian Ramp Compliant?

- Any noncompliant pedestrian access ramp that is affected by utility work must be replaced to meet ADA/AAB specifications.
 - Access ramps must have a running slope of not more than 8.3%. 7.5% running slope is preferred.
 - The cross slope of the landing must not exceed 2% cross slope. 1.5% cross slope is preferred.
-

❑ 15. Loop Detectors/Crosswalks

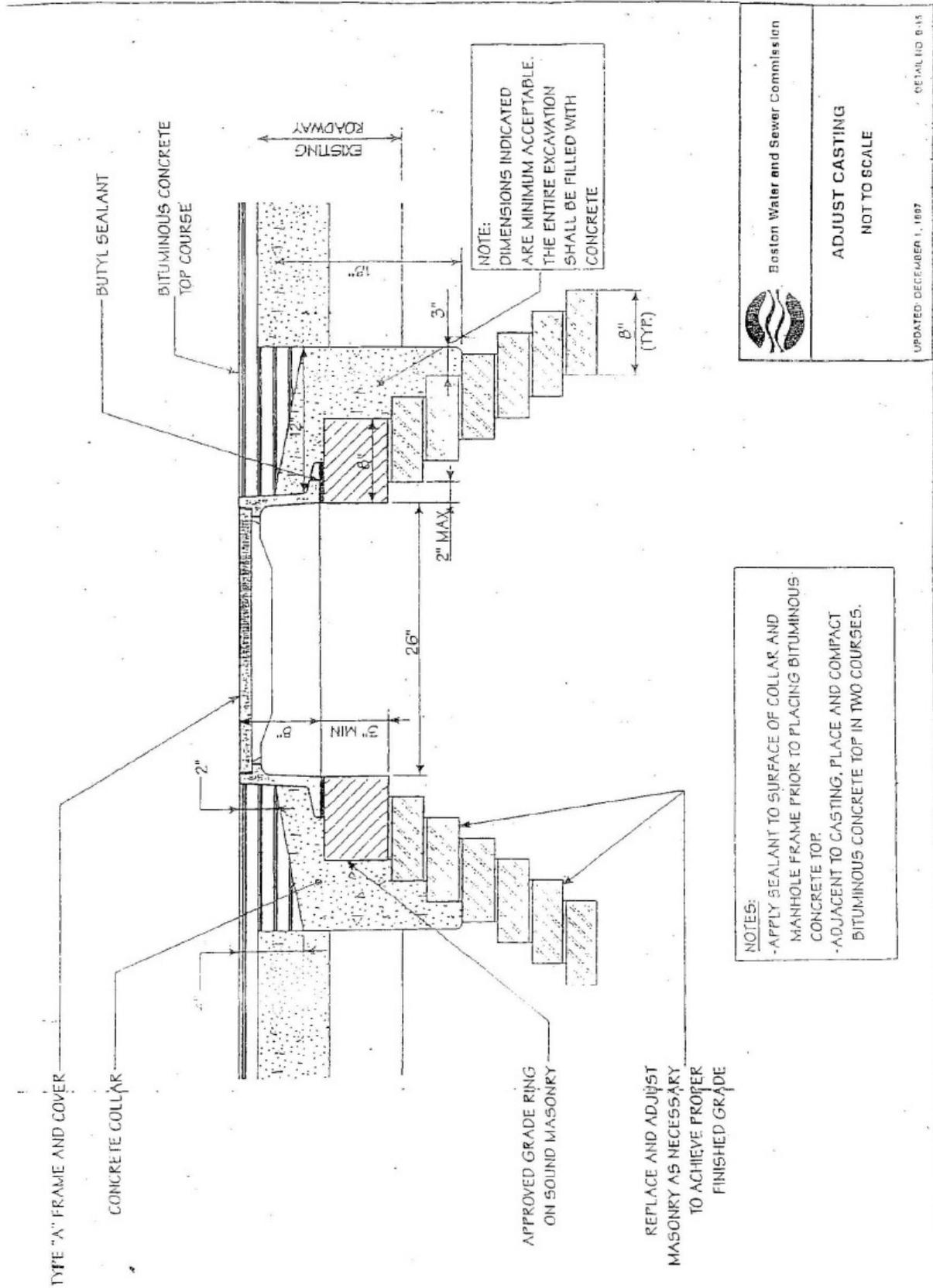
- Damaged traffic wire loops and/or thermal plastic lane markings must be replaced within 72 hours.
- Damaged lane markings on arterial/collector streets must be immediately replaced with tape or temporary paint.

APPENDIX D: Backfill and Pavement Cross Section



TYPICAL UTILITY TRENCH SECTION

NOT TO SCALE



NOTES:

- APPLY SEALANT TO SURFACE OF COLLAR AND MANHOLE FRAME PRIOR TO PLACING BITUMINOUS CONCRETE TOP.
- ADJACENT TO CASTING, PLACE AND COMPACT BITUMINOUS CONCRETE TOP IN TWO COURSES.

Boston Water and Sewer Commission

ADJUST CASTING

NOT TO SCALE

UPDATED: DECEMBER 1, 1997

DETAIL NO. B-15

APPENDIX F:

Boston Public Works Department Cement Concrete Pedestrian Ramp

&

MassDOT Highway Division Construction Standards – Wheelchair Ramps

Drawing Number: E 107.2 - 9

Date: August 2010

ITEM 701.21 CEMENT CONCRETE PEDESTRIAN RAMP SQUARE FOOT

General

Work under this item shall consist of constructing Portland cement concrete pedestrian ramps with detectable warning panels and to the relevant provisions of Section 701 of the MHD Standard Specifications for Highways and Bridges and the following:

Cement Concrete Pedestrian Ramps shall be installed at the direction and location specified by the Engineer and/or the City of Boston's representative. The ramps must fully comply with the Massachusetts Highway Department's "Wheelchair Ramp Standards" revised October 8, 1997, the Architectural Access Board (AAB) rules and regulations specifically, but not exclusively, the 521 CMR, and the Americans with Disabilities Act (ADA) of 1990. The Contractor shall exercise extreme care to construct the ramps in compliance, with proper cross slopes and clearances. **If the Contractor is unable to construct a compliant ramp he shall contact the Highway Division of the Boston Public Works Department.** All locations must be approved by the Boston Public Works Department, Highway Division.

The Contractor's attention is directed to the fact that many ramp locations, sidewalk slopes, edgestone reveal, pavement thickness and contours may require adjustments to comply with the above mentioned State and Federal access guidelines. The construction of all ramps shall require precise grading of sidewalk, edgestone and pavements. It shall be the Contractor's responsibility to request all measurements and grades from the Engineer prior to the construction of the ramps. The Contractor shall incorporate into his bid prices the cost of this labor intensive and precise work, as no additional compensation shall be provided for this work.

Materials, construction methods, measurement and payment shall conform to Items 701. and 701.1 regarding cement concrete.

All Cement Concrete Pedestrian Ramps shall be constructed to be six (6) inches thick.

The pedestrian ramp shall be defined as the area encompassing the transition down to the street level ramp, the ramp, the level landing and the transition back up to the existing curb grade. **Any repair, even those directly adjacent to the ramp, made outside of this area shall be paid for under items 701.01 and 701.1.**

Pedestrian ramps shall consist of cement concrete mix from an approved plant and have a detectable warning panel installed as shown on the Mass Highway Standard Drawing Nos. M/E 107.2.1R and M/E 107.6.5R, both dated December 2004, and as detailed on the following pages.

The Contractor shall exercise special care to minimize damage to trees as described in this Contract. All excavation in the presence of tree roots shall be done entirely by hand. Contractor shall refer to the Guidelines for Care of Trees During Construction which has been provided.

Where directed by the Engineer, the Contractor shall place loam and seed at the back of sidewalks.

Materials

Cement Concrete

Concrete shall conform to the specification requirements for Items 70.01 Concrete Sidewalk.

Detectable Warning Panels

Warning panels shall have dome geometry in accordance with ADA Regulations for Detectable Warning on Curb Ramps. They shall be raised truncated domes with a nominal diameter of 0.9 inches, a nominal height of 0.2 inches and a center to center spacing of 1.6 inches to 2.4 inches. Panels shall be 24 inches deep in the direction of travel and the full width of the ramp. The panel shall be a homogeneous glass and carbon reinforced composite, which is colorfast, and UV stable. The panel is to be colored throughout and not a painted coating. The color is to be contrasting to the background sidewalk color. The panels shall have a compressive strength in excess of 10,000 psi, flexural strength in excess of 3,000 psi and a slip resistance of 0.80 wet or dry.

Warning Panel shall have dome geometry in accordance with ADA Regulations for detectable Warning on Curb Ramps. They shall be raised truncated domes with a nominal diameter of 0.9 inches, a nominal height of 0.2 inches and a center to center spacing of 1.6 inches to 2.4 inches. Panels shall be 24 inches deep in the direction of travel and the full width of the ramp. The panel shall be a homogeneous glass and carbon reinforced composite, which is colorfast, and UV stable. The panel is to be colored throughout and not a painted coating. The color is to be contrasting to the background sidewalk color. The panels shall have a compressive strength in excess of 10,000 psi, flexural strength in excess of 3,000 psi and a slip resistance of 0.80 wet or dry.

Refer to the detail for on the following pages for Detectable Warning Panel For Pedestrian Ramps for the panel details, color schedule and an acceptable manufacturer. The Contractor may submit an equal product from another manufacturer for approval.

Construction Methods

Cement concrete shall be placed and finished level, true and smooth to the required dimensions prior to placement of the warning panel. The warning panel shall be installed in accordance with the manufacturer's procedures. Retrofit installations **will not be allowed** on newly constructed ramps. The tolerance for elevation differences between the panel and the adjacent surface shall not exceed 1/16th of an inch.

Contractors shall establish grade elevations at all pedestrian ramp locations, and shall set transition lengths according to the appropriate table in these Construction Standards (or to the details shown on the plans).

All wheelchair ramp joints and transition sections which define grade changes shall be formed, staked, and checked prior to placing cement concrete. All grade changes are to be made at joints.

The pedestrian ramp, including the detectable warning panel, shall be protected from all traffic, vehicular or pedestrian, during the curing process. Prior to completion all debris must be cleaned from the detectable warning panel.

Measurement and Payment

This item shall be paid for at the contract unit price bid per square foot of cement concrete pedestrian ramps as measured by the Engineer which price shall be full compensation for the stripping of concrete and pavement necessary for making neat lines, furnishing, hauling and placing all materials including work necessary for final completion of the Item as specified.

The pedestrian ramp shall be defined as the area encompassing the transition down to the street level ramp, the ramp, the level landing and the transition back up to the existing curb grade. Any repair, even those directly adjacent to the ramp, made outside of this area shall be paid for under items 701.01 and 701.1.

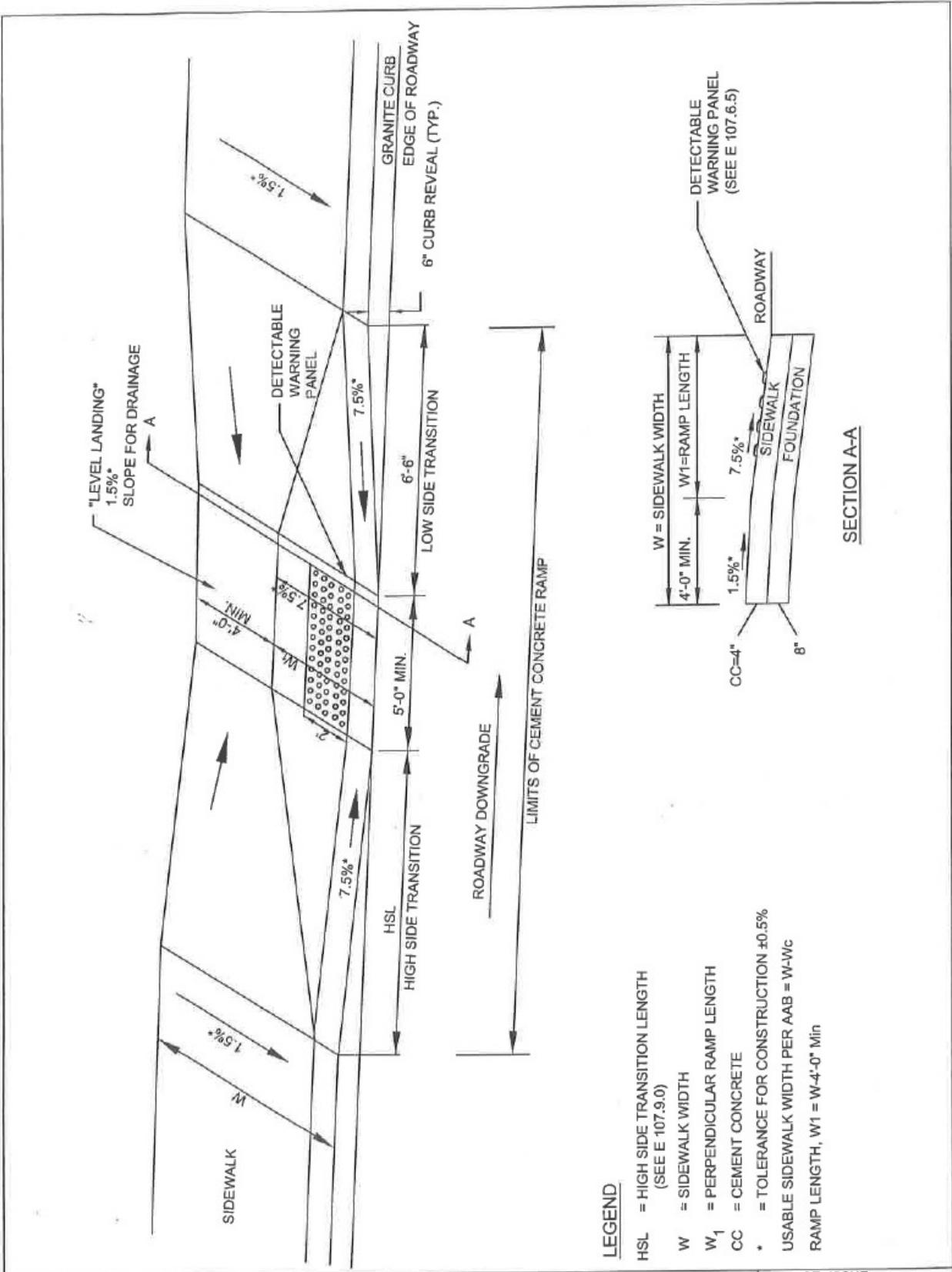
Furnishing and installing of the detectable warning panel, including all materials, tools, equipment and labor, shall be considered incidental to the bid price.

It is the Contractor's responsibility to ensure that all work complies with the Massachusetts Highway Department's "Wheelchair Ramp Standards" revised October 8, 1997, the Architectural Access Board (AAB) rules and regulations specifically, but not exclusively, the 521 CMR, and the Americans with Disabilities Act (ADA) of 1990.

It is the responsibility of the Contractor to notify the BPWD Highway Division of any repair that can't be constructed to the applicable ADA and AAB standards.

All work that does not meet the ADA and AAB standards shall be replaced by the Contractor with no additional cost to the City of Boston.

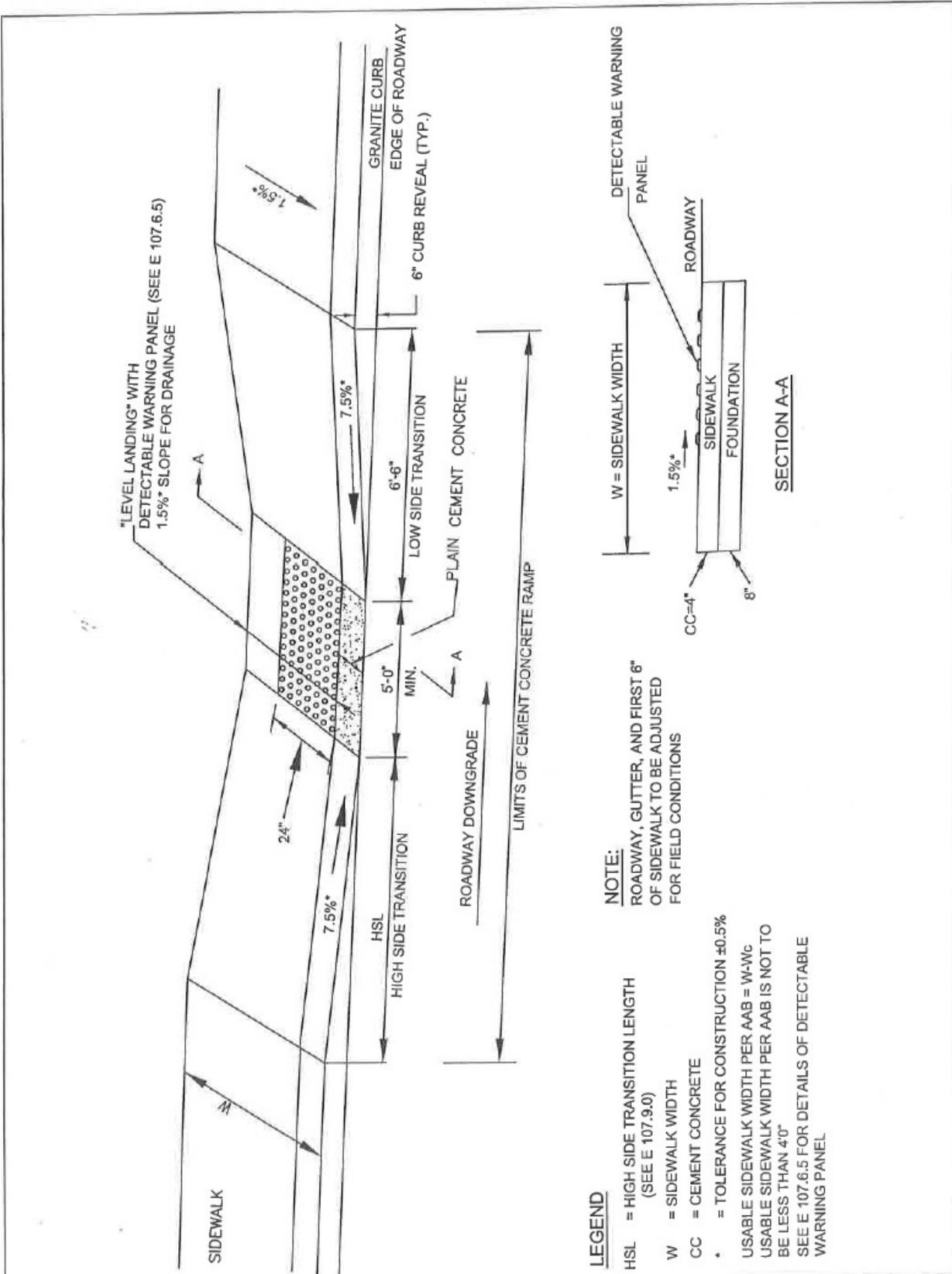
The Public Works Department will have a survey team available to assist with the grading of difficult ramps. The Contractor shall request the survey team through the Engineer.



WHEELCHAIR RAMPS
 LESS THAN 12'-4" SIDEWALK

DATE OF ISSUE
 AUGUST 2010

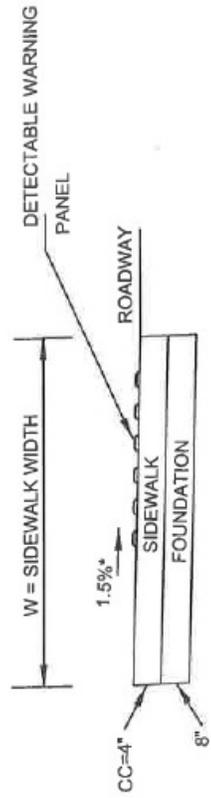
DRAWING NUMBER
E 107.2.0



LEGEND

- HSL = HIGH SIDE TRANSITION LENGTH (SEE E 107.9.0)
 - W = SIDEWALK WIDTH
 - CC = CEMENT CONCRETE
 - * = TOLERANCE FOR CONSTRUCTION ±0.5%
- USABLE SIDEWALK WIDTH PER AAB = W-Wc
 USABLE SIDEWALK WIDTH PER AAB IS NOT TO BE LESS THAN 4'0"
 SEE E 107.6.5 FOR DETAILS OF DETECTABLE WARNING PANEL

NOTE:
 ROADWAY, GUTTER, AND FIRST 6" OF SIDEWALK TO BE ADJUSTED FOR FIELD CONDITIONS



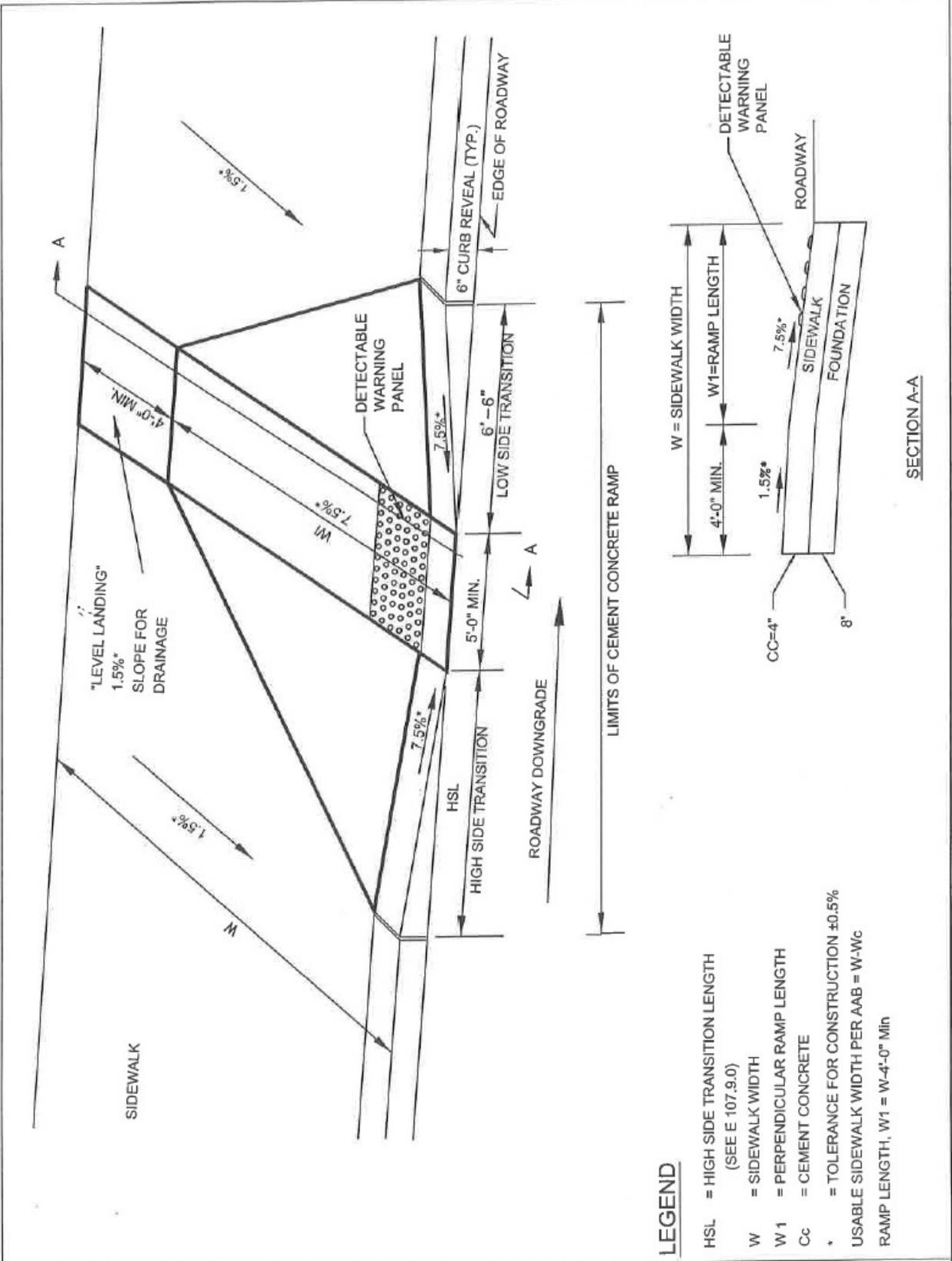
SECTION A-A



WHEELCHAIR RAMP ON ON NARROW SIDEWALK WITH DETECTABLE WARNING PANEL

DATE OF ISSUE
 AUGUST 2010

DRAWING NUMBER
E 107.2.1



LEGEND

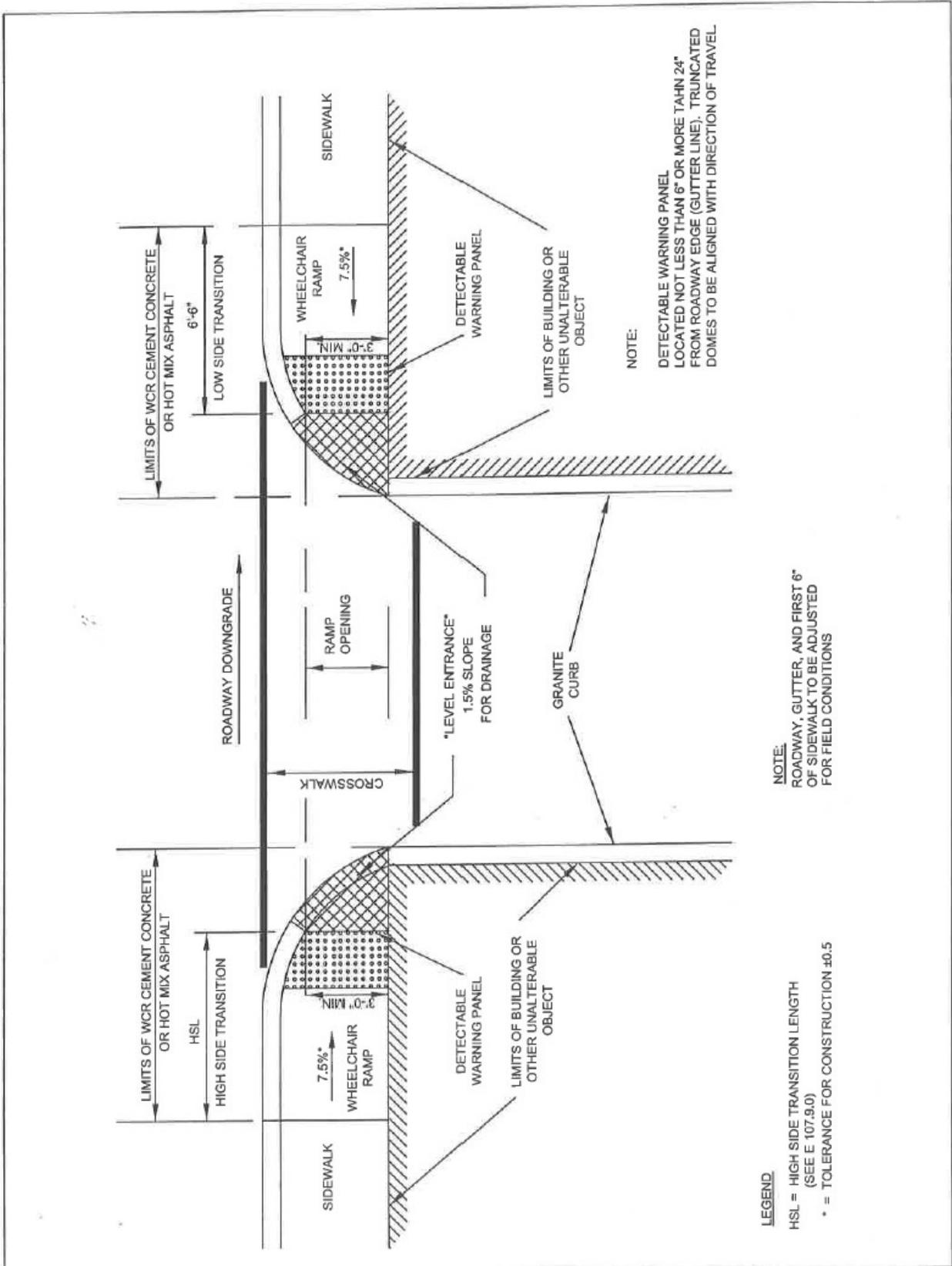
- HSL = HIGH SIDE TRANSITION LENGTH (SEE E 107.9.0)
- W = SIDEWALK WIDTH
- W1 = PERPENDICULAR RAMP LENGTH
- Cc = CEMENT CONCRETE
- * = TOLERANCE FOR CONSTRUCTION ±0.5%
- USABLE SIDEWALK WIDTH PER AAB = W-WC
- RAMP LENGTH, W1 = W-4'-0" Min

SECTION A-A



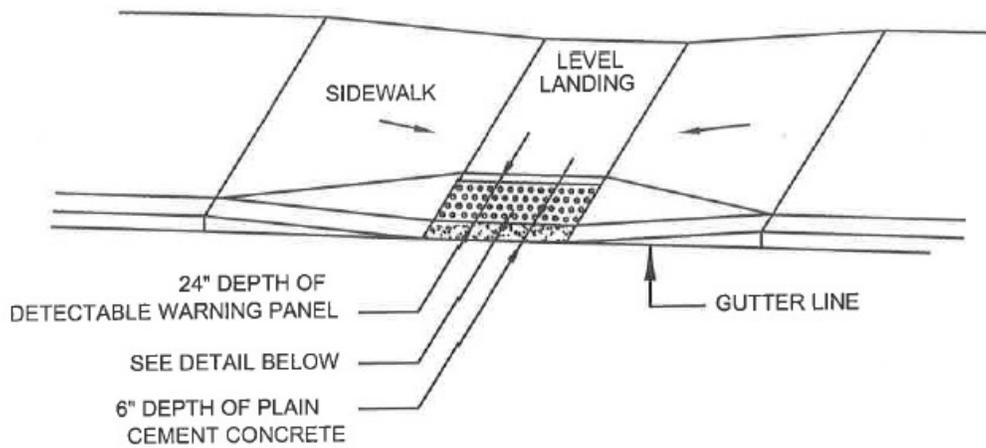
**WHEELCHAIR RAMPS
GREATER THAN 12'-4" SIDEWALK**

DATE OF ISSUE	AUGUST 2010
DRAWING NUMBER	E 107.3.0

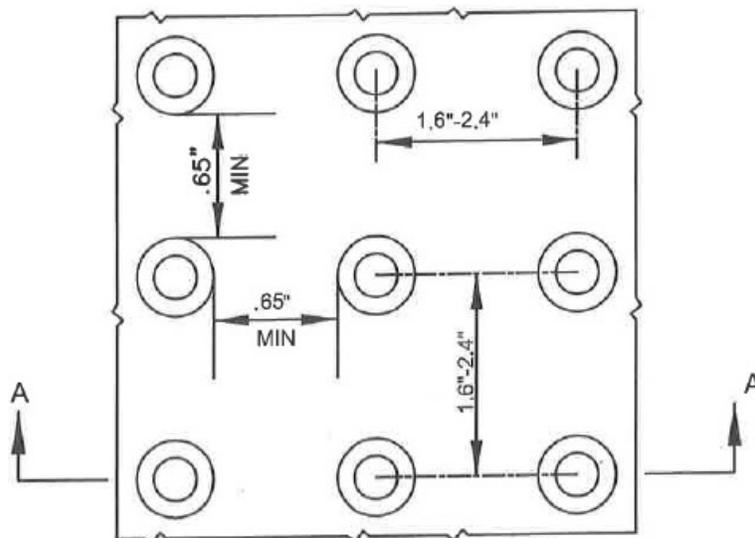


WHEELCHAIR RAMP FOR ONE CONTINUOUS DIRECTION OF PEDESTRIAN TRAVEL

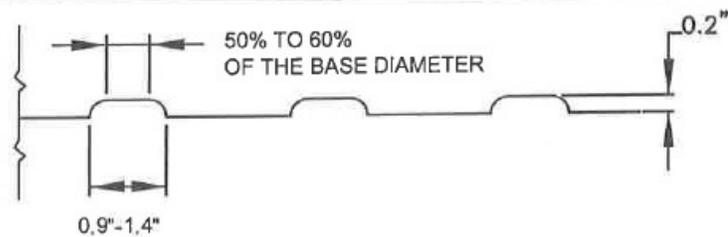
DATE OF ISSUE	AUGUST 2010
DRAWING NUMBER	E 107.6.0



TYPICAL INSTALLATION



DETAIL OF DETECTABLE WARNING PANEL



SECTION A-A

NOTE:

PANELS MAY BE CONCRETE PRECAST OR CAST IN PLACE OR OTHER SUITABLE MATERIAL PERMANENTLY APPLIED TO THE RAMP. DETECTABLE WARNING SURFACES SHALL CONTRAST VISUALLY WITH ADJACENT WALKING SURFACES EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT.



DETECTABLE WARNING PANEL
FOR WHEELCHAIR RAMPS

DATE OF ISSUE
AUGUST 2010

DRAWING NUMBER
E 107.6.5

ROADWAY PROFILE GRADE	*HIGH SIDE TRANSITION LENGTH
%	ENGLISH UNITS
=0%	6'-6"
>0% TO 1%	7'-8"
>1% TO 2%	9'-0"
>2% TO 3%	11'-0"
>3% TO 4%	14'-0"
>4% TO 5%	15'-0" Max

NOTE:

*BASED ON A DESIGN SLOPE OF
7.5% AND A REVEAL OF 6".



CURB TRANSITION LENGTH
FOR WHEELCHAIR RAMPS

DATE OF ISSUE
AUGUST 2010

DRAWING NUMBER
E 107.9.0

The Boston Public Works Department is evolving standards for pedestrian ramps constructed throughout the City of Boston. The appearance of the finished ramps will vary on the location of the ramp. Presently there are two designations, those constructed in Boston's Historic Districts and those outside these designated areas.

Non Historic Districts

- a. All standards for clearances and slopes set forth by the Americans with Disability Act (ADA), Massachusetts Architectural Board (AAB), and the City of Boston Access guidelines will be adhered to
- b. Where the existing sidewalk is brick the slope, flares and landing will be constructed of cement concrete as specified by Public Works Department specifications for Item 701.21, Cement Concrete Pedestrian Ramp.
- c. The tactile warning panel shall be pale yellow in color (Federal color # 23594).
- d. At the direction of the Engineer the tactile warning panel may be red in color (Federal color # 22144).

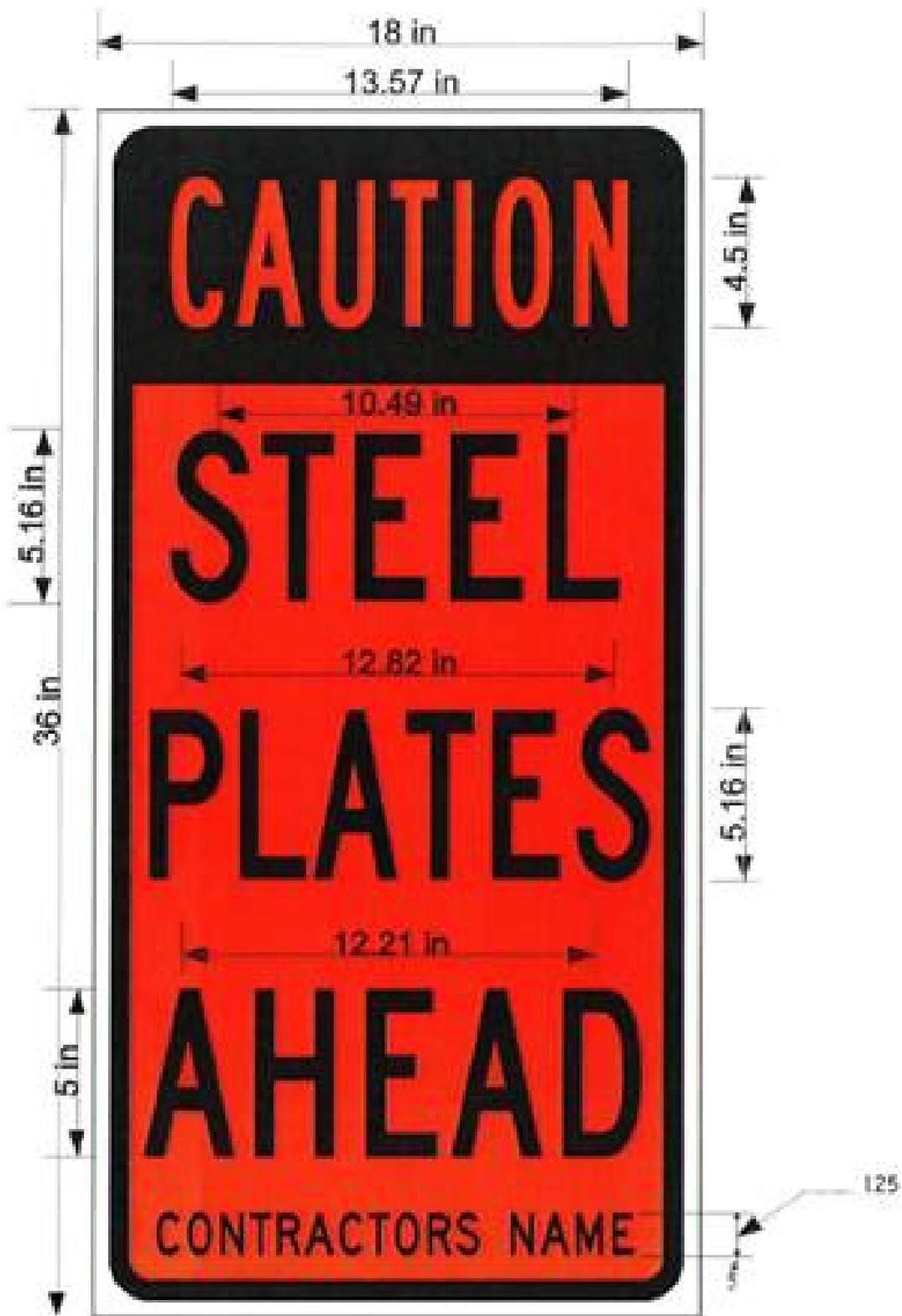
Historic Districts

- a. All standards for clearances and slopes set forth by the Americans with Disability Act (ADA), Massachusetts Architectural Board (AAB), and the City of Boston Access guidelines will be adhered to
- b. Where the existing sidewalk is cement concrete the slope, flares and landing will be constructed of cement concrete as specified by Public Works Department specifications for Item 701.21, Cement Concrete Pedestrian Ramp
- c. Where the existing sidewalk is brick the landing and sidewalk approaches will be constructed of wire cut bricks on a bituminous concrete setting bed and blended into the existing brick sidewalk. The slope and flares will be constructed of cement concrete as specified by Public Works Department specifications for Item 701.21, Cement Concrete Pedestrian Ramp. At the direction of the Engineer the landing may be constructed with cement concrete.
- d. The tactile warning panel in Historic Districts shall be red in color (Federal color # 22144).

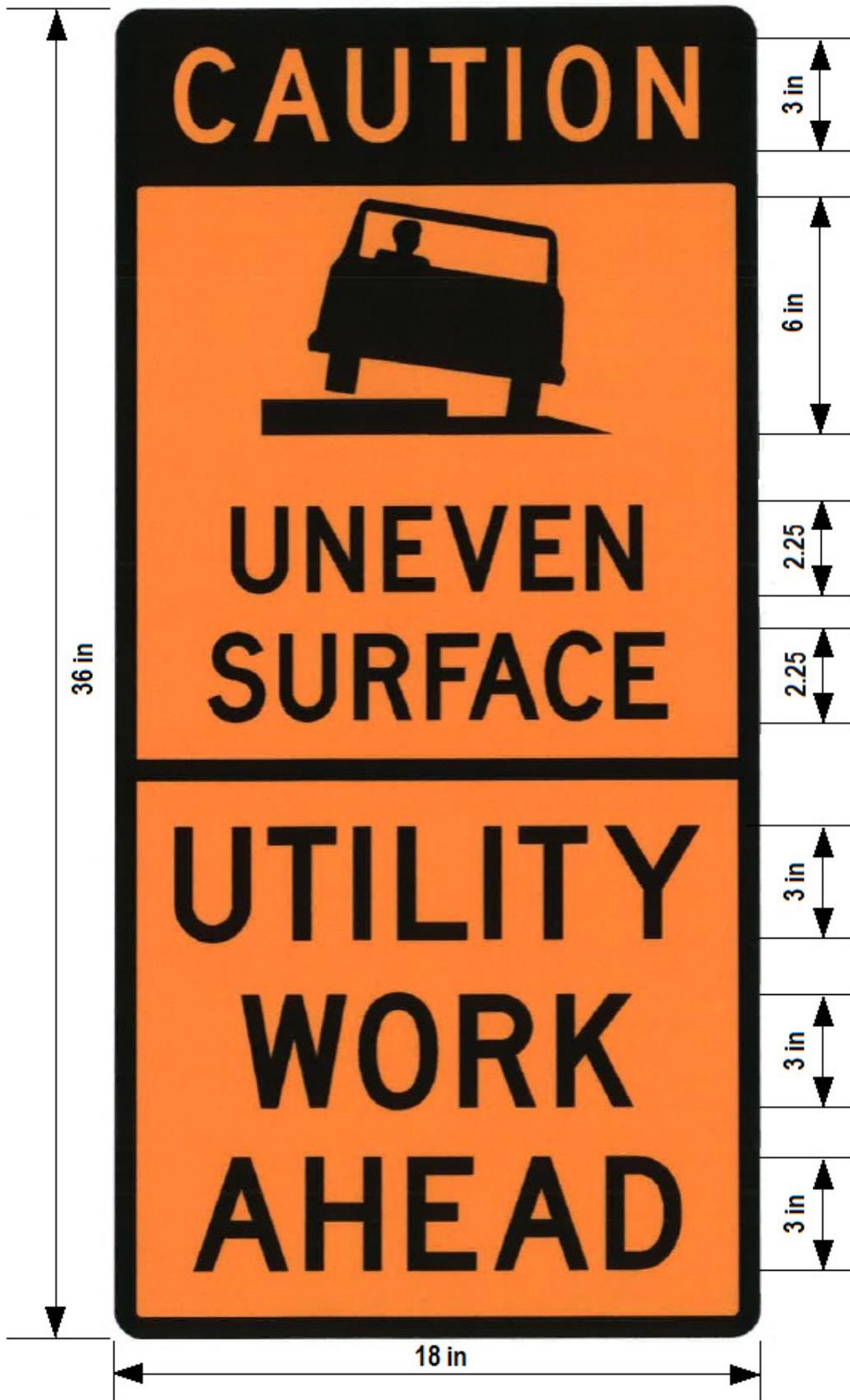
Because of the configurations and site challenges in Historic Districts the Public Works Department will coordinate with the respective Historic Commissions on the location and finish material of these ramps so as not to delay the construction process.

All sidewalks, driveways, and ramps constructed under this Contract will be six (6) inches in thickness.

APPENDIX G: STEEL PLATES AHEAD CAUTION SIGN



APPENDIX H: UNEVEN SURFACE AHEAD CAUTION SIGN



APPENDIX I: 520 CMR M.G.L. c. 82A “Jackie’s Law”

PART I. ADMINISTRATION OF THE GOVERNMENT

TITLE XIV. PUBLIC WAYS AND WORKS

CHAPTER 82A. EXCAVATION AND TRENCH SAFETY

Chapter 82A: Section 1. Unattended open trenches; safety hazards; rules and regulations; fines

Section 1. An excavator shall not leave an open trench unattended without first making reasonable effort to eliminate any recognized safety hazard that may exist as a result of leaving the open trench unattended. The commissioner of public safety, in conjunction with the director of labor and workforce development, or his designee, shall promulgate rules and regulations governing all construction related excavations and trench safety. The rules and regulations shall include, but not be limited to, a description of recognized safety hazards that may exist as a result of leaving open trenches or excavations unattended, a description of the procedures required or recommended by the department to eliminate safety hazards which may include covering, barricading or otherwise protecting open trenches from accidental entry, and a penalty structure for each violation of the proposed rules and regulations to be imposed by the department empowered with ensuring compliance with the rules and regulations. This penalty structure shall include the imposition of a fine for each violation of the regulations promulgated pursuant to this section. Any such fines collected by the department of public safety or the department of labor and workforce development shall be available for expenditure, without further appropriation, by those departments in an amount not to exceed \$100,000 during each fiscal year for the sole purpose of providing construction safety training for licensed operators of hoisting equipment, police department officials, fire department officials and building officials. Those departments may also charge a reasonable fee to help defray the costs associated with said training. Any monies collected from the imposition of these fines in excess of \$100,000 shall be transmitted monthly by those departments to the state treasurer who shall then deposit the excess funds into the General Fund. The department of public safety, in conjunction with the department of labor and workforce development, shall file a report detailing the amount of fines imposed, collected and expended pursuant to this section with the house and senate committees on ways and means and with the joint committee on public safety not later than August 15 of each year. The rules and regulations shall not be effective until the department of public safety has received a formal determination from the United States Secretary of Labor that the proposed rules or regulations do not seek to assume responsibility for development and enforcement therein of occupational safety and health standards relating to any occupational safety or health issue with respect to which a federal standard has already been promulgated under 29 U.S.C. section 667 or until the rules and regulations are approved by the United States Secretary of Labor as a state plan for the development of the standards and their enforcement pursuant to 29 U.S.C. section 667(c).

Chapter 82A: Section 2. Trench excavating permits; permits issued by board or officer; certificate of insurance; fees

Section 2. Each city, town or public agency shall designate 1 board or officer to issue permits for the excavation of trenches on privately owned land and for the excavation of a public way of a city or town. The permits, when issued, shall include a summary of sections 40 to 40D, inclusive, of chapter 82 and a summary of regulations promulgated by the department of public safety relative to chapter 146. No person shall, except in an emergency, contract for the making of or make a trench, in any public way, public property, or privately owned land until a permit is obtained from the appropriately designated person within the city, town, or public agency that is authorized to issue the permit. The person shall notify the local permitting authority of the exact location of the trench. A person making application for a trench excavation permit shall produce a certificate of insurance with general liability coverage of \$100,000 per person and \$300,000 per claim or provide evidence of self-insurance in equal amounts. The local permitting authority may charge a reasonable fee to cover the administrative costs of the trench excavation permitting process incurred by the municipality in connection with the review and processing of the permits; but, a gas company, as defined in section 1 of chapter 164, or any corporation that is subject to the provisions of chapter 165, 166 or 166A which has already paid a fee in order to attain a permit to excavate a public way of a city or town shall not be responsible for paying an additional fee for the same excavation.

Chapter 82A: Section 3. Form of trench excavation permits; required statements

Section 3. A permit to excavate a trench issued pursuant to this chapter may be in any form authorized by the local permitting authority, but shall include the following statements:

(1) A trench shall not be excavated unless the requirements of sections 40 to 40D, inclusive, of chapter 82, and any accompanying regulations, have been met and this permit is invalid unless the requirements have been complied with by the excavator applying for the permit including, but not limited to, the establishment of a valid excavation number with the underground plant damage prevention system as provided in section 76D of chapter 164.

(2) Trenches may pose a significant health and safety hazard. Pursuant to section 1 of chapter 82, an excavator shall not leave any open trench unattended without first making reasonable efforts to eliminate any recognized safety hazard that may exist as a result of leaving the open trench unattended. Excavators should consult regulations promulgated by the department of public safety in order to familiarize themselves with the recognized safety hazards associated with excavations and open trenches and the procedures required or recommended by the department to eliminate safety hazards which may include covering, barricading or otherwise protecting open trenches from accidental entry.

(3) Persons engaging in any trenching operation shall familiarize themselves with the federal safety standards promulgated by the Occupational Safety and Health Administration on excavations: 29 CFR 1926.650 et. seq., entitled Subpart P "Excavations".

(4) Excavators engaging in any trenching operation who utilize hoisting or other mechanical equipment subject to chapter 146 shall only employ individuals licensed to operate said equipment by the department of public safety pursuant to said chapter 146 and this permit shall be presented to the licensed operator before excavation is commenced.

(5) By applying for, accepting and signing this permit, the applicant hereby attests to the following: (i) that he has read and understands the regulations promulgated by the department of public safety with regard to construction related excavations and trench safety, (ii) that he has read and understands the federal safety standards promulgated by the Occupational Safety and Health Administration on excavations: 29 CFR 1926.650 et. seq., entitled Subpart P "Excavations", and (iii) that he is aware of and has, with regard to the proposed trench excavation on private property or proposed excavation of a city or town public way that forms the basis of his permit application, complied with the requirements of sections 40 to 40D, inclusive, of chapter 82 and with the requirements set forth in this chapter.

(6) This permit shall be posted in plain view on the site of the trench.

Chapter 82A: Section 4. Definitions

Section 4. For purposes of this chapter, a "trench" shall be defined as an excavation which is narrow in relation to its length, made below the surface ground in excess of 3 feet below grade and the depth of which is, in general, greater than the width, but the width of the trench, as measured at the bottom, is no greater than 15 feet and the words "excavator", "excavation" and "emergency" shall have the same meanings as defined in section 40 of chapter 82.

Chapter 82A: Section 5. Additional requirements

Section 5. The requirements of this chapter are in addition to the requirements set forth in sections 40 to 40D, inclusive, of chapter 82 and not in lieu thereof.

APPENDIX J: Permanent Pavement Restoration of Streets

The restoration of the permanent pavement or other permanent surface on the streets in the City of Boston shall be performed by the BPWD or contract forces as directed by the Commissioner, and as stipulated in these Rules and Specifications herein.

Permittees may complete permanent restoration of pavement where approved by the BPWD Commissioner.

The Permittee will guarantee a three (3) year warranty on all work performed. Any defect identified by the city within the three-year warranty period must be repaired to city specifications and require a sign off by the city inspector.

If the City determines after the expiration of the warranty period that inferior materials or poor workmanship resulted in a failed product, then the warranty will still be enforced and the Permittee will be responsible to make necessary repairs.

All City Ordinances, laws, contract specifications, and BPWD Rules and Specifications must be strictly complied with for all operations connected with the work defined by the permit. The materials, workmanship, manner and method of executing the work are to be performed to the complete satisfaction of the BPWD.

- B. On streets where curb-to-curb resurfacing occurs, the Permittee will be required to install or reconstruct compliant pedestrian ramps at all corners within the limits of the work to current ADA and AAB regulations.
- C. Permanent restoration of roadway patches or trenches may only take place after a minimum ninety (90) day waiting period unless otherwise authorized by BPWD. Once the ninety (90) day period expires, the Permittee must complete all permanent repairs within thirty (30) days, unless otherwise authorized by the PWD. In cases of deep excavations the City will allow the opening to sit through an entire winter freeze thaw cycle before permanent restoration of the roadway patch takes place.
- D. When street openings are ready for permanent repair, chalk lines must be laid out at a minimum of six (6) inches beyond the edges of the disturbed pavement caused by the original trench excavation, utility work, backfilling, or where recessed plates were used. If pavement fracture occurs (blowouts), or projections are made at short intervals outside the trench-line (line scored by pavement breaker), the chalk lines shall be extended out to this dimension to insure a straight trench line. This shall create a stable native shelf for pavement restoration. In no case shall undermining exist in the excavation below this six (6) inch shelf. **All openings to be permanently repaired must be saw cut.**
- E. Street openings permanently repaired must be rectangular in shape with all corners being of a ninety (90) degree angle.
- F. All surfaces and vertical faces of existing pavement shall be neat, free of loose materials. The vertical surface of the existing pavement shall be painted with asphalt cement emulsion (RS-1) to provide a tight seal preventing water infiltration to the existing pavement per MassDOT Standard Specifications to fully cover the paved surfaces prior to pavement installation.

All top surface joints between the permanent pavement repair and the existing pavement are to be sealed with an asphalt emulsion to prevent water infiltration, and sanded to prevent tracking of emulsion.

- G. When trenches are located within twenty-four (24) inches of the curb-line, making it impractical to leave a dimension between the trench-line and the curb, the trench line must be extended to the curb.
- H. If two (2) or more excavations are made by the same Utility and are within six (6) feet of one another, edge to edge, they shall be permanently repaired as one trench including the existing pavement between the two excavations.
- I. If an excavation is within six (6) feet, edge to edge, of a permanent repair, regardless of who is responsible for the original repair, the excavation shall be permanently repaired by the Permittee as one trench including the existing pavement between the two excavations.

- J. The placing temperature of Hot-Mixed Asphalt shall be between 255°F (degrees Fahrenheit) and 325°F (degrees Fahrenheit). All compaction by mechanical roller shall be completed before the mixture cools below 150°F (degrees Fahrenheit), or that temperature allowed by the asphalt binder manufacturer. This shall be checked using a thermometer suitable for this type of work.
- K. All permanent pavements shall consist of Boston Dense Binder and Boston Top Hot-Mixed Asphalt, unless otherwise directed by the BPWD.
1. **On arterial roadways** all permanent pavements shall consist of Boston Dense Binder and Boston Modified Top Hot-Mixed Asphalt, unless otherwise directed by the BPWD. The minimum cross section of asphalt shall consist of three (3) even compacted lifts of Boston Dense Binder measuring a total of five-and-one-half (5½) inches, followed by one (1) compacted course of two (2) inches of Boston Modified Top, or as directed by the City Engineer. The resulting minimum depth of seven-and-one-half (7½) inches must meet the material requirements for BPWD asphalt mixture. All lifts of asphalt shall be compacted using a mechanical roller.
 - a. The City reserves the right to instruct a Permittee installing pipe and/or conduit on arterial street cut openings to place seven-and-one-half (7½) inches of dense binder compacted in three (3) even lifts to the grade of the exiting roadway as the installation work progresses. A mechanical roller for the dense binder courses may be required as directed by a City Engineer. The Permittee will then be required to mill two (2) inches of the binder area minimum of 60-90 days after the work has been completed and then place one (1) compacted course of two (2) inches of Boston Modified Top. On trenches greater than one hundred (100) linear feet a mechanical roller will be required, unless otherwise directed by the City Engineer. Depending on the depth of the excavation the City may require the milling and paving operations not start until one year after the binder courses have been installed. This will include a full winter season.
 2. **On non-arterial roadways** all permanent pavements shall consist of Boston Dense Binder and Boston Top Hot-Mixed Asphalt, unless otherwise directed by the BPWD. The minimum cross section of asphalt shall consist of two (2) compacted lifts of Boston Dense Binder measuring two-and-one-half (2½) inches each, resulting in a total of five (5) inches, followed by one (1) compacted course of one-and-one-half (1½) inches of Boston Top. The resulting minimum depth of six-and-one-half (6½) inches must meet the material requirements for BPWD asphalt mixture. All lifts of asphalt shall be compacted using a mechanical roller.
 - a. The City reserves the right to instruct a Permittee installing pipe and/or conduit on non-arterial street cut openings to place six-and-one-half (6½) inches of dense binder compacted in three (3) even lifts to the grade of the exiting roadway as the installation work progresses. A mechanical roller for the dense binder courses may be required as directed by a City Engineer. The Permittee will then be required to mill one-and-one-half (1½) inches of the binder area a minimum of 60-90 days after the work has been completed and then place one (1) compacted course of one-and-one-half (1½) inches of Boston Top. On trenches greater than one hundred (100) linear feet a mechanical roller will be required, unless otherwise directed by the City Engineer. Depending on the depth of the excavation the City may require the milling and paving operations not start until one year after the binder courses have been installed. This will include a full winter season.
- L. Each dense binder course is to be thoroughly compacted by a power roller weighing not less than five (5) tons. The Top course will be thoroughly compacted by using a tandem roller weighing not less than ten (10) tons. Where space does not permit the use of a roller, each course shall be thoroughly tamped or otherwise compacted by a method approved by the Commissioner, and to the level of compaction equivalent to that achieved by a roller.
- M. The Boston top course material wearing surface must be applied to all openings within one week of installing the Boston Dense Binder.

- N. When multiple bar holes were made and not permanently capped, a permanent repair shall be required. The permanent repair shall consist of cutting out a full depth rectangular trench from six (6) inches before the first hole to six (6) inches beyond the last hole.
- O. All excavations by the Permittee on streets that are scheduled to be, or are actively being, reconstructed or resurfaced shall be tested to ensure 92% compaction on each lift of asphalt, unless otherwise authorized by the BPWD. All testing expenses will be the sole responsibility of the Permittee.
- P. Permittees who perform permanent roadway repair patches are required to mark their patches with a **gray** colored Utility Repair Tag. See section 10.05 for installation requirements.
- Q. Paving of trenches of over one-hundred (100) feet in length shall be paver-applied, unless otherwise authorized by the BPWD.
- R. Trenches approximately one-hundred (100) feet or longer shall require an overlay/inlay. The width of the overlay/inlay shall be a minimum of ten (10) feet; however the actual width will vary according to the trench configuration as determined by the Commissioner's representative. Multiple trenches less than one-hundred (100) feet in length that are in close proximity to one another shall require overlay/inlays. If the BPWD determines that a roadway requires a complete resurfacing, or that a trench requires an inlay, then cold-planing shall be required. When a street is opened by more than one Permittee, and damaged as to require curb-to-curb resurfacing, a percentage of all items used to repair the street shall be charged to the various Permittees based upon the proportion of damaged area determined by a consistent methodology. The City may contribute to the cost of curb-to-curb restoration in this circumstance on streets that are over five (5) years old. The Commissioner's representative and the Permittees concerned shall determine the extent of the City's participation after inspection of the street in question.

Acknowledgments

By the authority of the City of Boston's Commissioner of Public Works, Michael Dennehy, the Commissioner of Transportation, Gina Fiandaca, under the supervision of the Chief Engineer, Katie Choe, and Supervisor of Utility Coordination and Compliance, Mark Cardarelli, this manual was developed for application during street opening construction within the City of Boston's Right of Way.

The completion of this Manual has been a combined effort across Divisional and Departmental lines, between the Public Works Highway Division, Engineering Division, Permit Branch and the Boston Transportation Department with many individuals contributing time, energy, and expertise.