NOTICE OF PUBLIC HEARING
SUDBURY CONSERVATION COMMISSION
Monday, November 13, 2023 at 7:00 PM
Virtual Meeting

The Sudbury Conservation Commission will hold a public hearing to review the Notice of Intent filing to replace existing gas main within the 200-foot Riverfront Area, Bordering Land Subject to Flooding, Land Under Water Bodies, and 100-foot Buffer Zone, pursuant to the Wetlands Protection Act and Sudbury Wetlands Administration Bylaw, at Union Avenue and Codjer Lane, Sudbury, MA. Jaime Walker, Applicant. The hearing will be held on Monday, November 13, 2023 at 7:00 pm, via remote participation.

Please see the Conservation Commission web page for further information.

https://sudbury.ma.us/conservationcommission/meeting/conservation-commission-meeting-monday-november-13-2023/

SUDBURY CONSERVATION COMMISSION
11/1/23

BOSTON GAS COMPANY

Union Avenue & Codjer Lane Gas Main Replacement Project Sudbury, MA

Notice of Intent

Town of Sudbury
Conservation Commission
October 2023

Prepared for:
Boston Gas Company
170 Data Drive
Waltham, MA 02451

BSC Project No. 89840.80

Prepared by:

BSC GROUP

1 Mercantile Street, Suite 610 Worcester, MA 01608

BSC GROUP
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Engineers
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OCTOBER 26, 2023

Sudbury Conservation Commission
Department of Public Works Building
275 Old Lancaster Rd
Sudbury, MA 01776

RE: Union Avenue & Codjer Lane Gas Main Replacement Project
Sudbury, Massachusetts
Notice of Intent
Boston Gas Company

Dear Conservation Commission Members,

BSC Group, Inc. (BSC) is filing this Notice of Intent (NOI) on behalf of the Boston Gas Company (BGC) for the replacement of existing gas main crossing Hop Brook at the intersection of Union Avenue and Codjer Lane in Sudbury, MA ("The Project"). BGC is proposing to replace the existing, exposed steel gas main crossing over Hop Brook within the Union Avenue bridge crossing with a new, underground plastic gas line. This NOI is being submitted in accordance with the Massachusetts Wetlands Protection Act (M.G.L. Ch.131, S.40)(WPA), and its implementing regulations (310 CMR 10.00), and the Town of Sudbury's Wetland Bylaw (Article XX11), as well as to satisfy the requirements of Section 401, in accordance with 314 CMR 9.03(3). The location of the proposed activities is shown on the USGS Site Locus Map in **Attachment B**.

Specifically, BGC is proposing utility replacement activities within Riverfront Area (RFA), Bordering Land Subject to Flooding (BLSF). Land Under Water Bodies and Waterways (LUWW) and Buffer Zone associated with Hop Brook. The exposed pipe within the concrete bridge crossing over Hop Brook will be removed, the existing underground main within the roadway leading up to the bridge will be abandoned in place, and the new gas main will be installed under the Hop brook via Horizontal Directional Drilling (HDD). While no impacts are anticipated as a result of the work as the gas main will be below ground level, this NOI is being submitted as a contingency measure in the event of an inadvertent return of drilling fluid during HDD installation. Please also refer to the enclosed USGS Site Locus Map and Environmental Resources Map in Attachment B, and Site Photographs in **Attachment C**.

The proposed work is necessary to upgrade the main to meet current standards for the long-term reliability and resilience of the gas main crossing over Hop Brook. This NOI serves as a request for an Order of Conditions for the proposed underground gas main installation activities within resource areas.

Throughout the Project, Best Management Practices (BMPs), including sediment and erosion controls, will be implemented to ensure adjacent resource areas are adequately protected and impacts to the surrounding areas are minimized. Upon completion of the Project activities, all temporarily disturbed areas will be restored to pre-existing conditions to the maximum extent practicable.

We respectfully request that this matter be heard at the next scheduled Conservation Commission hearing. A copy of this application has been sent concurrently to the Northeast Regional Office of the Department of Environmental Protection (CERO), via eDEP. Hard copies will be provided to the Conservation Commission. If

you have any questions regarding the enclosed information, please contact me at (617) 896-4341 or Jaime Walker of BGC at (978) 551-1156. Thank you for your consideration in this matter.

Truly yours,
BSC Group, Inc.

Carolyn Gorss
Ecological Project Manager

cc: Jaime Walker, BGC
MassDEP NERO

Enclosures:

WPA Form 3 – Notice of Intent, NOI Fee Transmittal Form, and Copy of Filing Fee Checks
Attachment A Detailed Project Narrative
Attachment B USGS Site Locus Map, Environmental Resources Map, FEMA Firmette
Attachment C Site Photographs
Attachment D Abutters Notification Letter, Certified List of Abutters,
Attachment E National Grid's Best Management Practices Manual (EG-303)
Attachment F HDD Contingency Plan

Table of Contents

Union Avenue & Codjer Lane Gas Main Replacement Project
Sudbury, Massachusetts
Notice of Intent

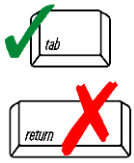
Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
MassDEP File Number
Document Transaction Number
Sudbury
City/Town

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



Note: Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

A. General Information

1. Project Location (**Note:** electronic filers will click on button to locate project site):

Union Ave and Codjer Lane — a. Street Address
Sudbury — b. City/Town
01776 — c. Zip Code

Latitude and Longitude:
42.367133 — d. Latitude
-71.419136 — e. Longitude

N/A-Public Roadway — f. Assessors Map/Plat Number
Public Roadway — g. Parcel /Lot Number

2. Applicant:

Jaime — a. First Name
Walker — b. Last Name
Boston Gas Company — c. Organization
170 Data Drive — d. Street Address
Waltham — e. City/Town
MA — f. State
02451 — g. Zip Code
(978) 551-1156 — h. Phone Number
i. Fax Number
jaime.walker@nationalgrid.com — j. Email Address

3. Property owner (required if different from applicant): ☐ Check if more than one owner

Public Roadway — a. First Name
b. Last Name
c. Organization
d. Street Address
e. City/Town
f. State
g. Zip Code
h. Phone Number
i. Fax Number
j. Email address

4. Representative (if any):

Carolyn — a. First Name
Gorss — b. Last Name
BSC Group, Inc. — c. Company
One Mercantile Street — d. Street Address
Worcester — e. City/Town
MA — f. State
01608 — g. Zip Code
508-561-7000 — h. Phone Number
i. Fax Number
cgorss@bscgroup.com — j. Email address

5. Total WPA Fee Paid (from NOI Wetland Fee Transmittal Form):

$750.00 — a. Total Fee Paid
$362.50 — b. State Fee Paid
$387.50 — c. City/Town Fee Paid

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

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A. General Information (continued)

6. General Project Description:

Boston Gas Company (BGC) proposes to replace existing gas mains at the intersection of Union Avenue and Codjer Lane in Sudbury, MA. Proposed activities include the abandonment of approximately 270 feet of 3-inch plastic and coated steel at the culvert crossing and replacement of approximately 300-feet of 4-inch plastic via open trench and HDD methodology.

7a. Project Type Checklist: (Limited Project Types see Section A. 7b.)

1. ☐ Single Family Home
2. ☐ Residential Subdivision
3. ☐ Commercial/Industrial
4. ☐ Dock/Pier
5. ☒ Utilities
6. ☐ Coastal engineering Structure
7. ☐ Agriculture (e.g., cranberries, forestry)
8. ☐ Transportation
9. ☐ Other

7b. Is any portion of the proposed activity eligible to be treated as a limited project (including Ecological Restoration Limited Project) subject to 310 CMR 10.24 (coastal) or 310 CMR 10.53 (inland)?

1. ☒ Yes ☐ No

If yes, describe which limited project applies to this project. (See 310 CMR 10.24 and 10.53 for a complete list and description of limited project types)

310 CMR 10.53(3)(d) - the construction, reconstruction, operation and maintenance of underground and overhead public utilities

If the proposed activity is eligible to be treated as an Ecological Restoration Limited Project (310 CMR10.24(8), 310 CMR 10.53(4)), complete and attach Appendix A: Ecological Restoration Limited Project Checklist and Signed Certification.

8. Property recorded at the Registry of Deeds for:

a. County	b. Certificate # (if registered land)
N/A - Public Roadway	
c. Book	d. Page Number
N/A	N/A

B. Buffer Zone & Resource Area Impacts (temporary & permanent)

1. ☒ Buffer Zone Only – Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.
2. ☐ Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

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B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Bank	1. linear feet	2. linear feet
b. ☐ Bordering Vegetated Wetland	1. square feet	2. square feet
c. ☒ Land Under Waterbodies and Waterways	27 (temporary) 1. square feet 0 3. cubic yards dredged	0 2. square feet

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
d. ☒ Bordering Land Subject to Flooding	621 (temporary) 1. square feet 0 3. cubic feet of flood storage lost	0 2. square feet 0 4. cubic feet replaced
e. ☐ Isolated Land Subject to Flooding	1. square feet 2. cubic feet of flood storage lost	3. cubic feet replaced
f. ☒ Riverfront Area	Hop Brook 1. Name of Waterway (if available) - **specify coastal or inland**	

2. Width of Riverfront Area (check one):

☐ 25 ft. - Designated Densely Developed Areas only

☐ 100 ft. - New agricultural projects only

☒ 200 ft. - All other projects

3. Total area of Riverfront Area on the site of the proposed project: >25,000 square feet

4. Proposed alteration of the Riverfront Area:

a. total square feet	b. square feet within 100 ft.	c. square feet between 100 ft. and 200 ft.
~799	~799	0

5. Has an alternatives analysis been done and is it attached to this NOI? ☒ Yes ☐ No

6. Was the lot where the activity is proposed created prior to August 1, 1996? ☒ Yes ☐ No

3. ☐ Coastal Resource Areas: (See 310 CMR 10.25-10.35)

Note: for coastal riverfront areas, please complete **Section B.2.f**. above.

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B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

Check all that apply below. Attach narrative and supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Online Users: Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Designated Port Areas	Indicate size under Land Under the Ocean, below	
b. ☐ Land Under the Ocean	1. square feet 2. cubic yards dredged	
c. ☐ Barrier Beach	Indicate size under Coastal Beaches and/or Coastal Dunes below	
d. ☐ Coastal Beaches	1. square feet	2. cubic yards beach nourishment
e. ☐ Coastal Dunes	1. square feet	2. cubic yards dune nourishment

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
f. ☐ Coastal Banks	1. linear feet	
g. ☐ Rocky Intertidal Shores	1. square feet	
h. ☐ Salt Marshes	1. square feet	2. sq ft restoration, rehab., creation
i. ☐ Land Under Salt Ponds	1. square feet 2. cubic yards dredged	
j. ☐ Land Containing Shellfish	1. square feet	
k. ☐ Fish Runs	Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above 1. cubic yards dredged	
l. ☐ Land Subject to Coastal Storm Flowage	1. square feet	

4. ☐ Restoration/Enhancement

If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b or B.3.h above, please enter the additional amount here.

a. square feet of BVW

b. square feet of Salt Marsh

5. ☒ Project Involves Stream Crossings

0
a. number of new stream crossings

b. number of replacement stream crossings

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C. Other Applicable Standards and Requirements

☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section C and complete Appendix A: Ecological Restoration Limited Project Checklists – Required Actions (310 CMR 10.11).

Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

1. Is any portion of the proposed project located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP)? To view habitat maps, see the *Massachusetts Natural Heritage Atlas* or go to http://maps.massgis.state.ma.us/PRI_EST_HAB/viewer.htm.

   a. ☐ Yes ☒ No

   If yes, include proof of mailing or hand delivery of NOI to:

   Natural Heritage and Endangered Species Program
   Division of Fisheries and Wildlife
   1 Rabbit Hill Road
   Westborough, MA 01581

   August 2021
   b. Date of map

   If *yes*, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18). To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete Section C.1.c, and include requested materials with this Notice of Intent (NOI); *OR* complete Section C.2.f, if applicable. *If MESA supplemental information is not included with the NOI, by completing Section 1 of this form, the NHESP will require a separate MESA filing which may take up to 90 days to review (unless noted exceptions in Section 2 apply, see below).*

   c. Submit Supplemental Information for Endangered Species Review*

      1. ☐ Percentage/acreage of property to be altered:

         (a) within wetland Resource Area _____ percentage/acreage

         (b) outside Resource Area _____ percentage/acreage

      2. ☐ Assessor's Map or right-of-way plan of site

2. ☒ Project plans for entire project site, including wetland resource areas and areas outside of wetlands jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work **

   (a) ☒ Project description (including description of impacts outside of wetland resource area & buffer zone)

   (b) ☒ Photographs representative of the site

* Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see https://www.mass.gov/ma-endangered-species-act-mesa-regulatory-review).
Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.

** MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process.

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C. Other Applicable Standards and Requirements (cont'd)

(c) ☐ MESA filing fee (fee information available at https://www.mass.gov/how-to/how-to-file-for-a-mesa-project-review).
Make check payable to "Commonwealth of Massachusetts - NHESP" and ***mail to NHESP*** at above address

*Projects altering **10 or more acres** of land, also submit:*

(d) ☐ Vegetation cover type map of site

(e) ☐ Project plans showing Priority & Estimated Habitat boundaries

(f) OR Check One of the Following

1. ☐ Project is exempt from MESA review.
Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, https://www.mass.gov/service-details/exemptions-from-review-for-projectsactivities-in-priority-habitat; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59.)

2. ☐ Separate MESA review ongoing. a. NHESP Tracking # b. Date submitted to NHESP

3. ☐ Separate MESA review completed.
Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.

3. For coastal projects only, is any portion of the proposed project located below the mean high water line or in a fish run?

a. ☒ Not applicable – project is in inland resource area only b. ☐ Yes ☐ No

If yes, include proof of mailing, hand delivery, or electronic delivery of NOI to either:

South Shore - Cohasset to Rhode Island border, and the Cape & Islands:

Division of Marine Fisheries -
Southeast Marine Fisheries Station
Attn: Environmental Reviewer
836 South Rodney French Blvd.
New Bedford, MA 02744
Email: dmf.envreview-south@mass.gov

North Shore - Hull to New Hampshire border:

Division of Marine Fisheries -
North Shore Office
Attn: Environmental Reviewer
30 Emerson Avenue
Gloucester, MA 01930
Email: dmf.envreview-north@mass.gov

Also if yes, the project may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP's Boston Office. For coastal towns in the Southeast Region, please contact MassDEP's Southeast Regional Office.

c. ☐ Is this an aquaculture project? d. ☐ Yes ☐ No

If yes, include a copy of the Division of Marine Fisheries Certification Letter (M.G.L. c. 130, § 57).

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C. Other Applicable Standards and Requirements (cont'd)

Online Users: Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

4. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?

   a. ☐ Yes ☒ No If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations). **Note:** electronic filers click on Website.

   b. ACEC

5. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?

   a. ☐ Yes ☒ No

6. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?

   a. ☐ Yes ☒ No

7. Is this project subject to provisions of the MassDEP Stormwater Management Standards?

   a. ☐ Yes. Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:

      1. ☐ Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol. 2, Chapter 3)

      2. ☐ A portion of the site constitutes redevelopment

      3. ☐ Proprietary BMPs are included in the Stormwater Management System.

   b. ☒ No. Check why the project is exempt:

      1. ☐ Single-family house

      2. ☐ Emergency road repair

      3. ☐ Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.

D. Additional Information

☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section D and complete Appendix A: Ecological Restoration Notice of Intent – Minimum Required Documents (310 CMR 10.12).

Applicants must include the following with this Notice of Intent (NOI). See instructions for details.

Online Users: Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department.

1. ☒ USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)

2. ☒ Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative to the boundaries of each affected resource area.

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D. Additional Information (cont'd)

3. ☒ Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.), and attach documentation of the methodology.

4. ☒ List the titles and dates for all plans and other materials submitted with this NOI.

Environmental Resources Map
a. Plan Title

BSC Group
b. Prepared By

N/A
c. Signed and Stamped by

10/11/23
d. Final Revision Date

1" = 100'
e. Scale

USGS Locus Map
f. Additional Plan or Document Title

7/31/2023
g. Date

5. ☐ If there is more than one property owner, please attach a list of these property owners not listed on this form.

6. ☐ Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.

7. ☐ Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.

8. ☒ Attach NOI Wetland Fee Transmittal Form

9. ☐ Attach Stormwater Report, if needed.

E. Fees

1. ☐ Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment:

2. Municipal Check Number

3. Check date

eDEP Payment
4. State Check Number

5. Check date

6. Payor name on check: First Name

7. Payor name on check: Last Name

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F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

Janine Walker	10/26/2023
1. Signature of Applicant	2. Date
Carolyn Doss	10/26/2023
3. Signature of Property Owner (if different)	4. Date
5. Signature of Representative (if any)	6. Date

For Conservation Commission:
Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

For MassDEP:
One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

Other:
If the applicant has checked the “yes” box in any part of Section C, Item 3, above, refer to that section and the Instructions for additional submittal requirements.

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

Massachusetts Department of Environmental Protection
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NOI Wetland Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

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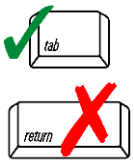

A. Applicant Information

1. Location of Project:

Union Ave and Codjer Lane	Sudbury
a. Street Address	b. City/Town
eDEP payment	$362.50
c. Check number	d. Fee amount

2. Applicant Mailing Address:

Jaime	Walker	
a. First Name	b. Last Name	
Boston Gas Company		
c. Organization		
170 Data Drive		
d. Mailing Address		
Waltham	MA	02451
e. City/Town	f. State	g. Zip Code
978-551-1156		jaime.walker@nationalgrid.com
h. Phone Number	i. Fax Number	j. Email Address

3. Property Owner (if different):

Public Roadway		
a. First Name	b. Last Name	
c. Organization		
d. Mailing Address		
e. City/Town	f. State	g. Zip Code
h. Phone Number	i. Fax Number	j. Email Address

B. Fees

To calculate filing fees, refer to the category fee list and examples in the instructions for filling out WPA Form 3 (Notice of Intent).

Fee should be calculated using the following process & worksheet. ***Please see Instructions before filling out worksheet.***

Step 1/Type of Activity: Describe each type of activity that will occur in wetland resource area and buffer zone.

Step 2/Number of Activities: Identify the number of each type of activity.

Step 3/Individual Activity Fee: Identify each activity fee from the six project categories listed in the instructions.

Step 4/Subtotal Activity Fee: Multiply the number of activities (identified in Step 2) times the fee per category (identified in Step 3) to reach a subtotal fee amount. Note: If any of these activities are in a Riverfront Area in addition to another Resource Area or the Buffer Zone, the fee per activity should be multiplied by 1.5 and then added to the subtotal amount.

Step 5/Total Project Fee: Determine the total project fee by adding the subtotal amounts from Step 4.

Step 6/Fee Payments: To calculate the state share of the fee, divide the total fee in half and subtract $12.50. To calculate the city/town share of the fee, divide the total fee in half and add $12.50.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

NOI Wetland Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Fees (continued)

Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee
Category 2e	1 (x 1.5)	$750.00	$750.00

Step 5/Total Project Fee: $750.00

Step 6/Fee Payments:

Total Project Fee:	$750.00 (a. Total Fee from Step 5)
State share of filing Fee:	$362.50 (b. 1/2 Total Fee **less $**12.50)
City/Town share of filling Fee:	$387.50 (c. 1/2 Total Fee **plus** $12.50)

C. Submittal Requirements

a.) Complete pages 1 and 2 and send with a check or money order for the state share of the fee, payable to the Commonwealth of Massachusetts.

Department of Environmental Protection
Box 4062
Boston, MA 02211

b.) **To the Conservation Commission:** Send the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and the city/town fee payment.

To MassDEP Regional Office (see Instructions): Send a copy of the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and a **copy** of the state fee payment. (E-filers of Notices of Intent may submit these electronically.)

Attachment A

Union Avenue & Codjer Lane Gas Main Replacement Project
Sudbury, MA
Notice of Intent

PROJECT NARRATIVE

BSC GROUP

1 INTRODUCTION

BSC Group, Inc. (BSC) is filing this Notice of Intent (NOI) on behalf of the Boston Gas Company (BGC) for the replacement of existing gas main crossing Hop Brook at the intersection of Union Avenue and Codjer Lane in Sudbury, MA ("The Project"). BGC is proposing to replace the existing, exposed steel gas main crossing over Hop Brook within the Union Avenue bridge crossing with a new, underground plastic gas line. This NOI is being submitted in accordance with the Massachusetts Wetlands Protection Act *(M.G.L. Ch.131, S.40)(WPA)*, and its implementing regulations *(310 CMR 10.00)*, and the Town of Sudbury's Wetland Bylaw *(Article XX11)*, as well as to satisfy the requirements of Section 401, in accordance with 314 CMR 9.03(3). The location of the proposed activities is shown on the USGS Site Locus Map in **Attachment B**.

Specifically, BGC is proposing utility replacement activities within Riverfront Area (RFA), Bordering Land Subject to Flooding (BLSF). Land Under Water Bodies and Waterways (LUWW) and Buffer Zone associated with Hop Brook. The exposed pipe within the concrete bridge crossing over Hop Brook will be removed, the existing underground main within the roadway leading up to the bridge will be abandoned in place, and the new gas main will be installed under the Hop brook via Horizontal Directional Drilling (HDD). A portion of the gas main will be replaced adjacent to the existing underground main, located in RFA, Buffer Zone and BLSF. However, a portion of the main will be relocated in the roadway in order to facilitate the HDD installation of replacement pipe below Hop Brook. While no impacts are anticipated as a result of the work as the gas main will be below ground level, this NOI is being submitted as a contingency measure in the event of an inadvertent return of drilling fluid during HDD installation. Please also refer to the enclosed USGS Site Locus Map and Environmental Resources Map in **Attachment B**, and Site Photographs in **Attachment C**.

Activities Subject to Review under the WPA and the Local Bylaw

The installation of 27 feet of new gas main within LUWW is subject to review under both the WPA and the local bylaw. Elevation data indicates that Union Ave is approximately 137 feet at the bridge crossing and FEMA Base Flood Elevation to the west and east of Union Ave Is 137 and 134 feet, respectively. Conservatively, this NOI is also being submitted assuming the roadway is within BLSF, for temporary impacts to install 27 linear feet of gas main and one (1) HDD exit/entry pit (18-ft x 80-ft), within the roadways of Codjer Lane within BLSF, RFA and Buffer Zone. While no impacts are anticipated as a result of the HDD as the replacement gas main will be pulled through a drilled hole well below ground level, this NOI is being submitted as a contingency measure in the event of an inadvertent return, an "Inadvertent Return" (IR) Contingency Plan is provided in **Attachment F**. In the unlikely event of an IR (i.e. drilling fluid release to the ground surface/river bottom), BGC and its contractor will implement immediate response actions as outlined in the attached IR Plan that will address the methods, materials, and equipment that would be used to stop, contain, and clean up an inadvertent return.

Activities Subject to Review under the Local Bylaw Only

The installation of approximately 20 linear feet of gas main within the roadway of Union Ave and Codjer Lane within Buffer Zone and RFA is an exempt activity under 310 CMR

10.02(2)(b)(2)(i) and 310 CMR 10.58(6)(b), as the activities will be installed within the existing paved roadway, work will be conducted within the roadway and all trenches will be closed at the completion of each workday. One (1) temporary entry/exit pit for the HDD portion of the work will also be located within the Buffer Zone and RFA. While these activities are exempt under the WPA, the Sudbury Bylaw does not recognize these exemptions for utility replacements within the roadway, and these activities are subject to permitting under the Bylaw only.

Exempt Activities
The_removal of a section of exposed existing gas main protruding through the bridge substructure and over Hop is an exempt maintenance activity in accordance with the provision of the Massachusetts Wetlands Protection Act (MGL 131-40)[1] and regulations 310 CMR 10.02 (2)(a)(2), as well as the Sudbury Wetlands Administration Bylaw, Section 3.

2 EXISTING CONDITIONS

The Project is located within the existing paved roadway at the intersection of Union Ave and Codjer Lane, where Union Ave crosses Hop Brook. Land use immediately adjacent to the Project area is comprise of portions of commercial areas, with areas of mixed agricultural land. Portions of the proposed work are located below Hop Brook and within the associated RFA, which is a Department of Fish and Wildlife (DFW) Coldwater Fisheries Resources.

2.1 Resource Area Summary

BSC conducted both a desktop analysis (using MassGIS data layers and publicly available data), and field investigations of the proposed Project area, to assess permitting requirements pursuant to the WPA. BSC Wetland Scientists delineated wetlands in July 2023, in accordance with the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, ed. J.S. Wakely, R.W. Lichvar, and C. C. Noble. ERDC/EL TR-12-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center (Version 2.0) and methodology described in the Massachusetts Department of Environmental Protection's (MassDEP) *Handbook for Delineation of Bordering Vegetated Wetlands* (Published in September 2022).

Existing conditions, wetland resource areas, and buffer zones (in relation to the proposed activities), are shown on the Environmental Resources Map in **Attachment B**. Representative photographs of site conditions are provided in **Attachment C.** The proposed activities are within LUWW, BLSF, RFA, and 100-ft Buffer Zone to Inland Bank, all associated with Hop Brook. No impacts to resource areas are proposed within Bordering Vegetated Wetland (BVW). Gas lines will all be constructed underground, and no permanent impacts are proposed within any of the affected resource areas or Buffer Zone. According to MassGIS

[1] *MGL 131-40 allows for "maintaining, repairing, or replacing, but not substantially changing or enlarging" existing transmission line structures or facilities without filing a Notice of Intent.*

data layers and classifications provided in 314 CMR 4.00, the Project area is located within a Wellhead Protection Areas Zone II. Hop Brook is classified as a Coldwater Fisheries Resource (CFR) by the MA Department of Fisheries and Wildlife.

Adjacent to the Union Avenue Bridge, the Banks of Hop Brook are vegetated with shrubs and deciduous trees.

3 PROJECT ACTIVITIES & ASSOCIATED IMPACTS

3.1 Project Summary

Gas line replacement activities are proposed at the intersection of Union Avenue and Codjer Lane (in Sudbury). This will include abandonment of sections of the old gas line, removal of the exposed gas main crossing over Hop Brook, installation of replacement line via trenching within the roadway, and installation of new gas line at the Hop Brook Crossing via HDD. In total, BGC is proposing abandonment of approximately 220 feet of 3-inch plastic and approximately 50 feet of 3-inch coated steel at the crossing and replacement of approximately 300-feet of 4-inch plastic via open trench and HDD along Union Avenue at Codjer Lane. The exposed steel pipeline at the culvert associated with Hop Brook will be removed and capped.

The Project has been designed to avoid adverse impacts to the greatest possible extent. Project impacts to the ground surface and topography are temporary in nature and will be restored upon completion of the Project. While no impacts to resource areas are anticipated from the HDD activities, this NOI is being filed as a contingency (in the event of an IR), and to fulfill the Section 401 requirements for work underneath LUWW. Details on the proposed activities are discussed further in the following sections. The work will begin as soon as the project is permitted.

3.2 Open Trench Gas Main Installation

BGC will install replacement gas main from the existing main to the HDD entry/exit pits via direct trench installation within the roadway. This process involves cutting the roadway surface and removing the existing asphalt, using a backhoe or excavator to excavate to the required depth, sidecasting the trench spoils directly adjacent to the trench, and installing the replacement pipe in the prepared trench. BGC will complete the work in sections and backfill the trench with the excavated soils. Following the installation of the main, the disturbed area will be restored to pre-existing conditions and grades, which will Involve repaving or patching the roadway surface. Excess soils and the removed asphalt will be removed from the site and disposed of in accordance with applicable regulations.

3.3 HDD Installation

HDD involves a specialized drill rig that creates a tunnel along a pre-determined path under waterways or other impediments. This specialized rig then then "pulls" the new pipeline through the drilled tunnel. During construction, BGC will stage HDD equipment on temporary work areas within the roadway on each side of the river. Crews will primarily operate

equipment from the entry pit work area in Sudbury and the new ~300-foot main will be welded together and pulled through the bore from the exit pit and stringing area. General guidance for "Inadvertent Return" (IR) Contingency Plans is provided in **Attachment F**; however, the contractor will be responsible for providing a site-specific IR Contingency Plan prior to construction.

All equipment will be located within the roadway, Best Management Practices (BMPs) will be in place prior to and during the ground-disturbing work, and the area will be restored to preexisting conditions to the extent practicable.

For the HDD, the bore hole will be drilled in a predetermined path using a surface-launched drilling rig staged on Union Ave over Hop Brook. BGC will establish two HDD staging areas at the exit and entry locations of the replacement section of pipeline and mobilize equipment into these areas. BGC is proposing to excavate the exit pit within the existing road layout to the east side of Hop Brook. The exit pit will require a work area of approximately 30-ft x 20-ft. The entry pit will be established within the existing road layout to the east side of Hop Brook. The entry pit will require a work area of approximately 150-ft x 20-ft. Each pit will be excavated using a mini excavator from within the paved roadway. Excavated material will either be removed from the Project site or stored in an upland area for use as backfill upon completion of the Project. Once the gas line has been installed and connections made, the entry/exit pits will be backfilled to their pre-existing grade. Where applicable, the area will be repaved. No increase in impervious surfaces or changes in fill/grade are proposed.

Entry and exit pits will help start the bore, receive the guided bore on the other side, and contain the drilling fluid returns. To complete the HDD bore, a pilot hole is drilled using a small-diameter (3 to 5-inch) drill string and a drill bit entering the ground through the "entry pit." Bentonite drilling fluid, composed of bentonite clay and water, is delivered to the cutting head through the drill string to cool the drill bit, provide hydraulic cutting action, and remove cutting spoils as the drilling fluid returns to the entry point of the pilot hole. A completed pilot hole and subsequent drilling will end with the drill head resurfacing at the "exit pit." The pilot hole is then enlarged with one or more reaming passes, until the desired hole diameter is obtained based on the proposed pipeline diameter. Once the bore hole is appropriately sized, machinery will pull the replacement pipeline through the bore hole, test the pipe for integrity (to ensure there was no damage to the pipe during the pull), and tie the replacement pipeline into the existing lines.

HDD is done with the help of a viscous fluid known as drilling fluid, comprised of a non-toxic colloidal clay called bentonite. Bentonite absorbs water which causes it to swell, creating a viscous fluid. This fluid is used to remove cut borings, stabilize the bore hole, and cool the drill head. Fresh drilling fluid is expelled through a nozzle at the tip of the drill head. Throughout the process, the fluid is cycled through a reclaimer, a machine which removes the drill cuttings, and allows the fluid to be recycled for continuous use within the project. The entry and exit pits will also ensure that the drilling fluid is collected and contained.

At the end of the installation, any the drilling fluid remaining in the drill pits or on-site will be collected and transported to an appropriate location offsite. Once the bore hole has been drilled and stabilized, the gas line will be pulled through.

The gas main will be installed at an appropriate depth to avoid any negative impacts to the existing bridge structure. Approximately 27-ft of the underground HDD-drilled gas main will be within LUWW. As the activities are below ground, no alteration of LUWW is anticipated, and no impacts to the waterway are proposed.

3.4 HDD Contingency Plan

Since the HDD gas line installation method involves the use of drilling fluid that is slightly pressurized during the drilling process in order to function properly, there is potential with any HDD that some drilling fluid may migrate out of the drill hole through existing cracks or fissures in the ground and escape to the surface. However, the design of the HDD, including length and depth of the drill path, takes into consideration the nature of the underlying soil and bedrock geology to be drilled through, as well as the presence of sensitive resources, in order to minimize the potential for an inadvertent return.

As well as following the general guidelines of the IR Contingency Plan included as **Attachment F,** BGC's drilling contractor will prepare a site-specific IR Contingency Plan prior to the commencement of construction. This plan will set forth the methodologies, monitoring activities, and procedures to be followed to prevent an inadvertent release of drilling fluid and will establish the process and procedures to be followed if an inadvertent release of drilling fluid occurs. Response and restoration actions will include:

- Continuous resource area monitoring during installation and stop work procedures if an IR is observed
- Detailed descriptions and locations of containment devices such as booms, curtains, or sediment and erosion controls
- Materials removal and disposal procedures both in resource areas and in uplands
- Reporting procedures and timelines

3.5 Gas Main Removal

BGC will remove and cap the ends of the existing exposed gas main currently within the Union Street bridge structure. The exposed portion of the existing main passing through the concrete arch opening of the bridge over Hop Brook will be cut by hand where it is flush with the concrete abutments, and then capped. This removal is typically done by workers on foot or on a floating platform that is anchored to the bridge, depending on the water levels. The remainder of the main within the roadway to be abandoned in place.

BMPs will be installed prior to the work beginning, and all equipment will be operated from the roadway or work will be performed by hand. Nets may be installed beneath the bridge to collect any debris from the pipe cutting from entering the river.

4 ALTERNATIVES ANALYSIS

The initial design for the Hop Brook was the attachment of the replacement gas line to the existing bridge crossing Hop Brook. However, BGC's and the Town's structural engineer deemed attachment infeasible due to the condition of the existing bridge.

4.1 Utility Bridge Alternative

The utility bridge alternative would require an extensive engineering effort to design a bridge that would fully span Hop Brook and support the new gas pipeline. A utility bridge would require excavation in the 100-ft Buffer Zone and 200-ft RFA for bridge foundations on either side of Hop Pond. The bridge would then cross above Inland Bank and LUWW. As a new over-the-water crossing of a navigable waterway, a new Ch 91 License would be required, and the bridge would represent a permanent aboveground alteration to the 100-ft Buffer Zone and 200-ft RFA, as well as introduce a new visual intrusion into the environment of Hop Brook. Because of permanent impacts to resource areas, the need for a new Ch 91 License, more challenging engineering design, higher costs, and the visual alteration of Hop Brook, this alternative was not selected.

4.2 HDD Alternative

As described above, the HDD Alternative will not involve any permanent impacts to jurisdictional resource areas, will not include any aboveground facilities, and requires less cost and time as it does not involve design and installation of a secondary utility bridge over the Hop Brook. For these and other reasons, the HDD Alternative is the preferred alternative.

In conclusion, the HDD installation method is less impactful to wetland resources, involves less permitting, will not result in a permanent aboveground facility (the utility bridge) that would be visible to the public, is less costly, and is a simpler engineering design. No significant adverse impacts on wetland resource areas or values protected by the WPA are anticipated with the HDD method.

5 PROPOSED AVOIDANCE, MINIMIZATION, AND MITIGATION TECHNIQUES

BGC has established procedures that are to be followed by all employees and its contractors for accessing sites and performing construction and maintenance activities on natural gas transmission ROWs. These procedures, discussed in National Grid's Environmental Guidance Document (EG-303NE) Access, Maintenance and Construction Best Management Practices, ensure that BGC's projects are completed in accordance with all applicable environmental laws and regulations as well as company policies and compliance objectives.

5.1 Sediment and Erosion Controls

Erosion and sediment control measures will be installed prior to the commencement of work based on site conditions. These controls will function to mitigate work-related erosion and sedimentation, and to serve as a physical boundary to delineate work areas to contain construction activities within approved locations. Proposed erosion and sediment control measures may include a turbidity curtain, straw wattles, weed free bale barriers, fiber rolls, or similar treatment.

Erosion and sediment controls will be inspected on a regular basis and maintained in working order until all disturbed areas are stabilized. Please refer to **Attachment E** for erosion and sediment control details.

5.2 Construction Access

Construction access will be from the existing paved roadway of Union Ave and Codjer Lane. The last crew to leave the site each day would be responsible for regularly sweeping the roadways, if and when sediment and/or rock have been tracked onto the street. No off-road vehicle or equipment access is anticipated for the Project.

5.3 Dewatering

Dewatering may be necessary during construction of the entry/exit pits or pipeline trench. Water will be pumped into a filter bag or a dewatering basin consisting of a filter bag with straw bale or silt fence perimeter controls which will be located in approved areas outside wetland resource areas. The pump intake hose will not be allowed to set on the bottom of the excavation throughout dewatering. The basin and all accumulated sediment will be removed following dewatering operations.

5.4 Stormwater Management

There will be no change in grade or increase in impervious area as a result of this Project. Therefore, permanent stormwater management appurtenances will not be required. BGC will implement sediment and erosion control BMPs to manage stormwater during the construction phase of the project.

5.5 Inadvertent Return Contingency Plan

In the unlikely event of an inadvertent return of drilling fluid during HDD operations, BGC will implement their IR Contingency Plan, a copy of which is provided in **Attachment F**.

6 CONFORMANCE WITH THE PERFORMANCE STANDARDS OF THE WPA

The Project has been designed to meet all applicable performance standards for each affected resource area under the WPA. In accordance with general condition *310 CMR*

10.57(4), BGC will implement BMPs to ensure the adjacent resource areas are adequately protected, and impacts to the surrounding area are reduced, minimized, and restored to the maximum extent practicable. Project-specific BMPs are further discussed in *Section 6.0*.

6.1 Land under Water Bodies and Waterways [310 CMR 10.56(4)]

a) Where the presumption set forth in 310 CMR 10.56(3) is not overcome, any proposed work within Land under Water Bodies and Waterways shall not impair the following:

1. The water carrying capacity within the defined channel, which is provided by said land in conjunction with the banks;

No impacts to water carrying capacity are anticipates as part of the Project – all activities within LUWW will be located below ground and within the roadway layout.

2. Ground and surface water quality.

No impacts to water quality are anticipates as part of the Project – all activities within LUWW will be located below ground and within the paved roadway and shall comply with all applicable regulatory standards. BCG's IR Contingency Plan, **Attachment F**, along with implement sediment and erosion controls to address any potential construction phase impacts.

3. The capacity of said land to provide breeding habitat, escape cover and food for fisheries; and

No impacts to aquatic habitat functions are anticipates as part of the Project – all activities within LUWW will be located below ground and within the paved roadway.

4. The capacity of said land to provide important wildlife habitat functions. A project or projects on a single lot, for which Notice(s) of intent is filed on or after November 1, 1987, that (cumulatively) alter(s) up to 10% or 5,000 square feet (whichever is less) of land in this resource area found to be significant to the protection of wildlife habitat, shall not be deemed to impair its capacity to provide important wildlife habitat functions. Additional alterations beyond the above threshold may be permitted if they will have no adverse effects on wildlife habitat, as determined by procedures established under 310 CMR 10.60.

No impacts to wildlife habitat functions are anticipates as part of the Project – all activities within LUWW will be located below ground and within the paved roadway.

5. Work on a stream crossing shall be presumed to meet the performance standard set forth in 310 CMR 10.56(4)(a) provided the work is performed in compliance with the Massachusetts Stream Crossing Standards by consisting of a span or embedded culvert in which, at a minimum, the bottom of a span structure or the upper surface of an embedded culvert is above the elevation of the top of the bank, and the structure

> *spans the channel width by a minimum of 1.2 times the bankfull width. This presumption is rebuttable and may be overcome by the submittal of credible evidence from a competent source. Notwithstanding the requirements of 310 CMR 10.56(4)(a)4., the impact on Land under Water Bodies and Waterways caused by the installation of a stream crossing is exempt from the requirement to perform a habitat evaluation in accordance with the procedures established under 310 CMR 10.60.*

This standard is not applicable to the project – all activities within LUWW will be located below ground and within the paved roadway.

6.2 Riverfront Area [310 CMR 10.58(4)]

> a – Protection of Other Resource Areas. The work shall meet the performance standards for all other resource areas within the riverfront area… When work in the riverfront area is also within the buffer zone to another resource area, the performance standards for the riverfront area shall contribute to the protection of the interests of M.G.L. c. 131 § 40 in lieu of any additional requirements that might otherwise be imposed on work in the buffer zone within the riverfront area.

The Project has been designed to conform to the performance standards of other resource areas as described in this Notice of Intent.

> b – Protection of Rare Species. No project may be permitted within the riverfront area which will have any adverse effect on specified habitat site of rare wildlife or upland, vertebrate or invertebrate species, as identified in the procedures established under 310 CMR 10.59 or 10.37, or which will have any adverse effect on vernal pool habitat certified prior to the filing of the Notice of Intent.

Not Applicable; there are no specified habitat areas of rare species or certified vernal pools within the Project area.

> c – Practicable and Substantially Equivalent Economic Alternatives. There must be no practicable and substantially equivalent economic alternative to the proposed project with less adverse effects on the interests identified in M.G.L. c. 131 § 40.

Section 4.0 summarizes the alternatives analysis conducted for this Project. Work within RFA has been limited as much as possible. There are no practicable and substantially equivalent economic alternatives to the Project with less adverse effects on the interests identified in the Act.

> d – No Significant Adverse Impact. The work, including proposed mitigation measures, must have no significant adverse impact on the riverfront area to protect the interests identified in M.G.L. c. 131, § 40.

No permanent impacts to the Riverfront are proposed.

6.3 Bordering Land Subject to Flooding [310 CMR 10.57(4)(a)]

1. Compensatory storage shall be provided for all flood storage volume that will be lost as the result of a proposed project within Bordering Land Subject to Flooding, when in the judgment of the issuing authority said loss will cause an increase or will contribute incrementally to an increase in the horizontal extent and level of flood waters during peak flows. Compensatory storage shall mean a volume not previously used for flood storage and shall be incrementally equal to the theoretical volume of flood water at each elevation, up to and including the 100-year flood elevation, which would be displaced by the proposed project. Such compensatory volume shall have an unrestricted hydraulic connection to the same waterway or water body. Further, with respect to waterways, such compensatory volume shall be provided within the same reach of the river, stream or creek.

Work within mapped BLSF will be within a paved roadway. Following the completion of work, all disturbed areas will be returned to pre-existing conditions. No loss in flood storage will occur.

2. Work within Bordering Land Subject to Flooding, including that work required to provide the above-specified compensatory storage, shall not restrict flows so as to cause an increase in flood stage or velocity.

Following the completion of work, all disturbed areas will be returned to pre-existing conditions. No change in flow will occur.

3. Work in those portions of bordering land subject to flooding found to be significant to the protection of wildlife habitat shall not impair its capacity to provide important wildlife habitat functions. Except for work which would adversely affect vernal pool habitat, a project or projects on a single lot, for which Notice(s) of Intent is filed on or after November 1, 1987, that (cumulatively) alter(s) up to 10% or 5,000 square feet (whichever is less) of land in this resource area found to be significant to the protection of wildlife habitat, shall not be deemed to impair its capacity to provide important wildlife habitat functions. Additional alterations beyond the above threshold, or altering vernal pool habitat, may be permitted if they will have no adverse effects on wildlife habitat, as determined by procedures contained in 310 CMR 10.60

No alteration in wildlife habitat is proposed.

6.4 Restoration

Disturbed areas will be stabilized, and the construction site will be returned to existing conditions to the maximum extent practicable. All construction materials, vehicles, and non-biodegradable sediment controls will be removed from the site upon completion of work.

7 CONCLUSION

Although portions of the Project will occur within jurisdictional resource areas, the proposed Project will:

- Result in no impacts to BLSF, RFA, Bank, LUWW or Buffer Zone, as all activities will be underground or involve the removal of existing infrastructure;
- Utilize appropriate BMPs to protect wetland resource areas from sedimentation and soil disturbance during Project activities; and,
- Implement an IR Contingency Plan in the event of an inadvertent return.

Therefore, BGC respectfully requests the Sudbury Conservation Commission find this proposal adequately protective of the public interests identified in the WPA and the Local Bylaw and issue an Order of Conditions for the proposed Project as currently designed.

Attachment B

Union Avenue & Codjer Lane Gas Main Replacement Project
Sudbury, MA
Notice of Intent

USGS Site Locus Map
Environmental Resources Maps
FEMA Firmette
Site Plans

BSC Group

File Location: G:\GISPrj\8984080\Output\Maps\MXD\ReportMaps\UnionAve_USGSLocus_20230731.mxd
Date Saved: 7/31/2023 11:21:46 AM

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1 inch = 2,000 feet
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UNION AVENUE GAS MAIN REPLACEMENT

USGS Site Location Map
Sudbury, MA

nationalgrid
BSC GROUP

THIS DOCUMENT IS INTENDED FOR GENERAL PLANNING & INFORMATION PURPOSES ONLY. ALL MEASUREMENTS & LOCATIONS ARE APPROXIMATE.

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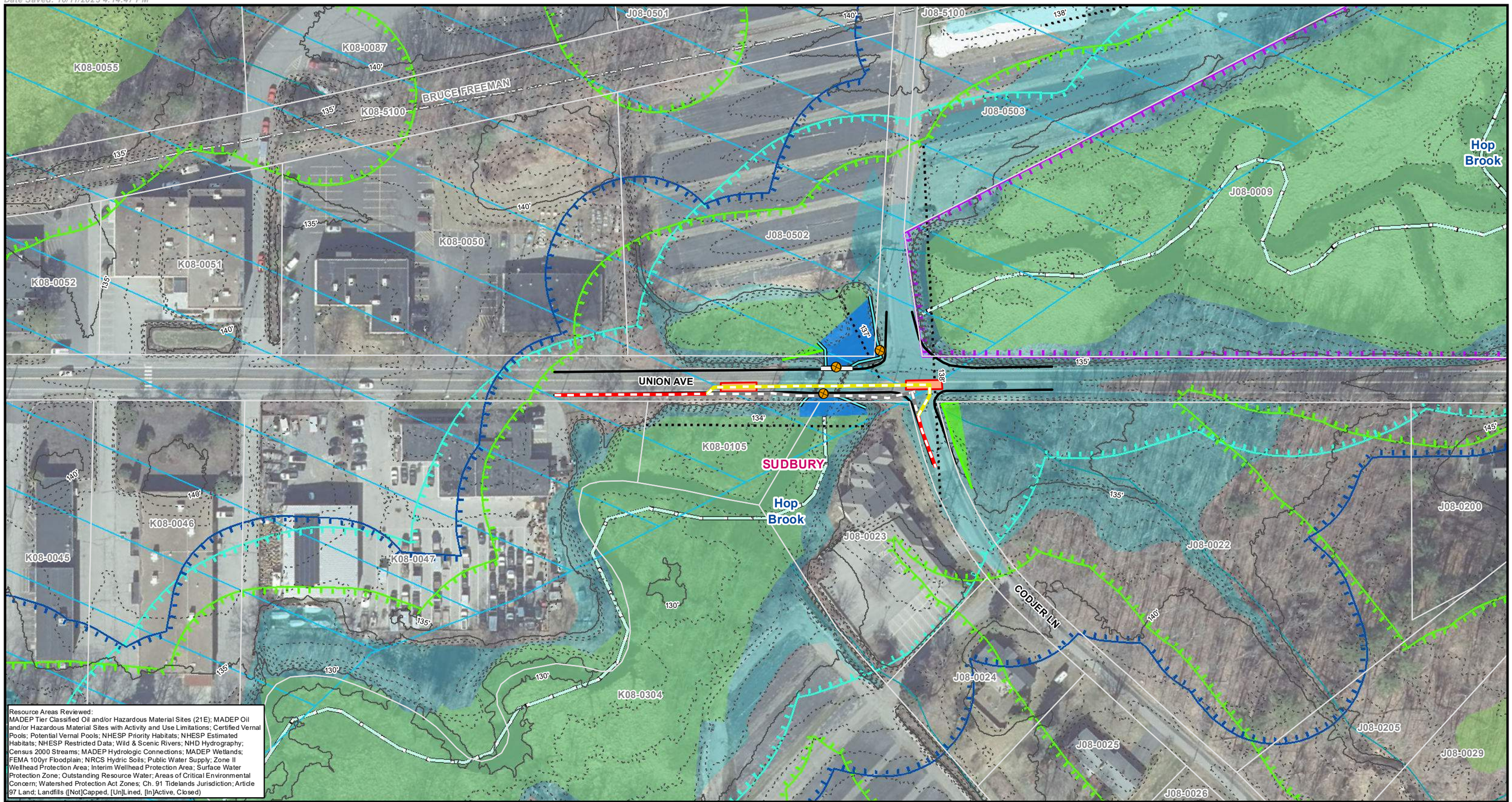
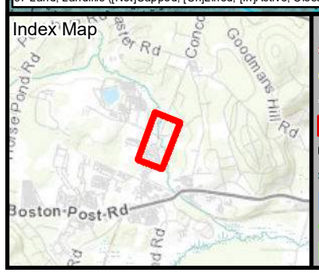


Resource Areas Reviewed:
MADEP Tier Classified Oil and/or Hazardous Material Sites (21E); MADEP Oil and/or Hazardous Material Sites with Activity and Use Limitations; Certified Vernal Pools; Potential Vernal Pools; NHESP Priority Habitats; NHESP Estimated Habitats; NHESP Restricted Data; Wild & Scenic Rivers; NHD Hydrography; Census 2000 Streams; MADEP Hydrologic Connections; MADEP Wetlands; FEMA 100yr Floodplain; NRCS Hydric Soils; Public Water Supply; Zone II Wellhead Protection Area; Interim Wellhead Protection Area; Surface Water Protection Zone; Outstanding Resource Water; Areas of Critical Environmental Concern; Watershed Protection Act Zones; Ch. 91 Tidelands Jurisdiction; Article 97 Land; Landfills ([Not]Capped, [Un]Lined, [In]Active, Closed)

Index Map



Legend

- Existing Gas Main
- Proposed Gas Main
- Existing Gas Main to be Abandoned
- Approximate HDD Entry/Exit Pits
- Coldwater Fisheries Resources
- Field Delineated Stream Bank
- Field Delineated Stream Area*
- Field Delineated Wetland Boundary
- Field Delineated Wetland*
- MADEP Hydrologic Connections
- MADEP Wetlands*
- MADEP Open Water*
- 100ft Adjacent Upland Resource Area
- 100ft Buffer to Wetlands & Streams
- 200ft Riverfront Area
- FEMA 100yr Floodplain*
- Zone II Wellhead Protection Area
- Parcel Boundaries
- Bicycle Trails
- Pavement Limits
- Concrete Headwall
- Culvert
- 1ft Contours
- 5ft Contours
- FEMA Floodplain Contour

Article 97 Lands

- Municipal

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1 inch = 100 feet
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Feet

Indicates Layers Set to Transparency

UNION AVENUE GAS MAIN REPLACEMENT

Environmental Resources Map

Sudbury, MA

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

nationalgrid
BSC GROUP

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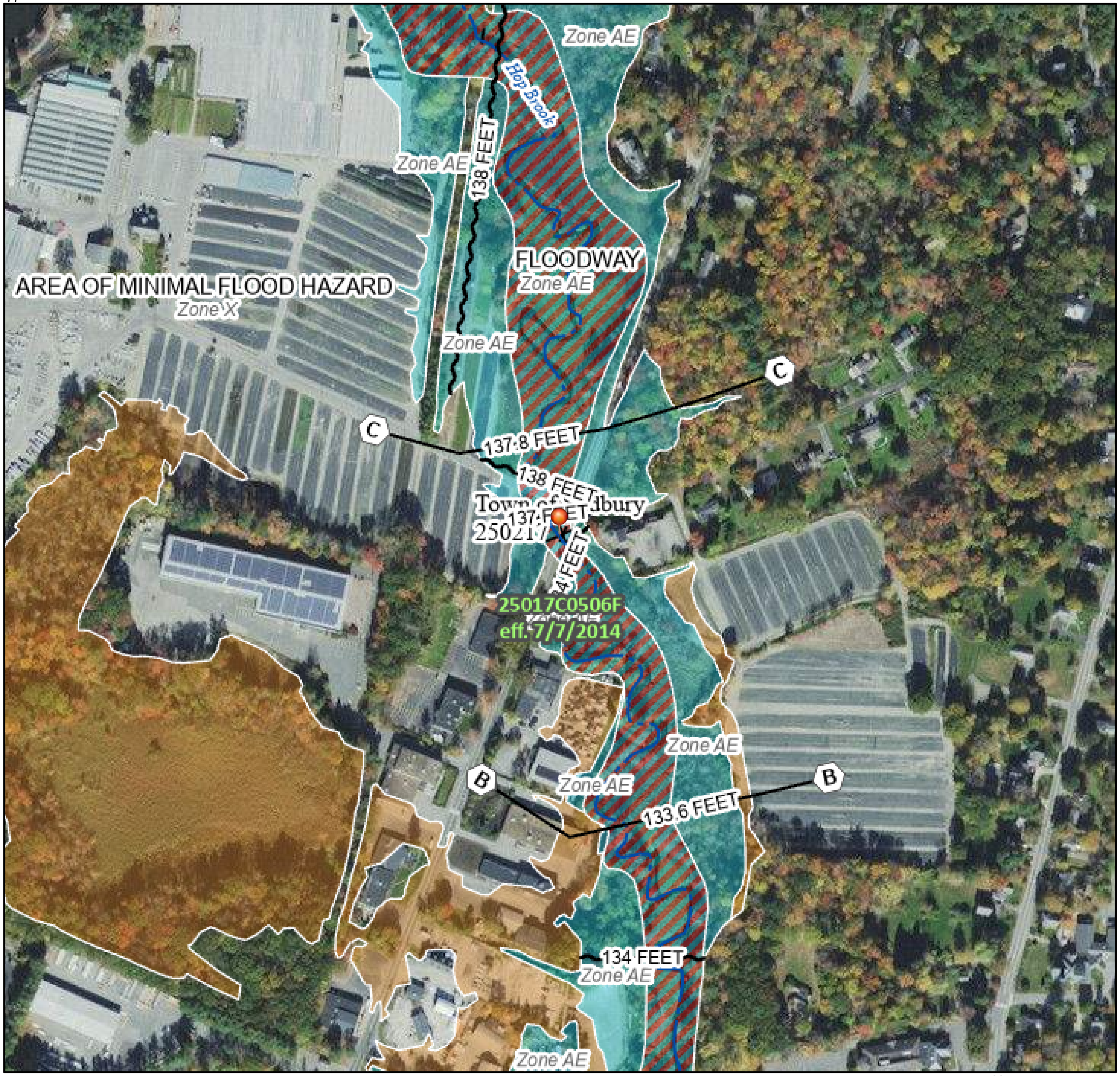

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- &URVV6HFWLRQVZLWK$QQXDO&KDQFH :DWHU6XUIDFH(OHYDWLRQ
- &RDVWDO7UDQVHFW
- %DVH)ORRG(OHYDWLRQ/LQH%)(
- /LPLWRI6WXG\
- -XULVGLFWLRQ%RXQGDU\
- &RDVWDO7UDQVHFW%DVHOLQH
- 3URILOH%DVHOLQH
- +\GURJUDSKLF)HDWXUH

0$3 3$1(/6

- 'LJLWDO'DWD$YDLODEOH
- 1R'LJLWDO'DWD$YDLODEOH
- 8QPDSSHG

7KHSLQGLVSOD\HGRQWKHPDSLVDQDSSUR[LPDWH SRLQWVHOHFWHGE\WKHXVHUDQGGRHVQRWUHSUHVHQW DQDXWKRULWDWLYHSURSHUW\ORFDWLRQ

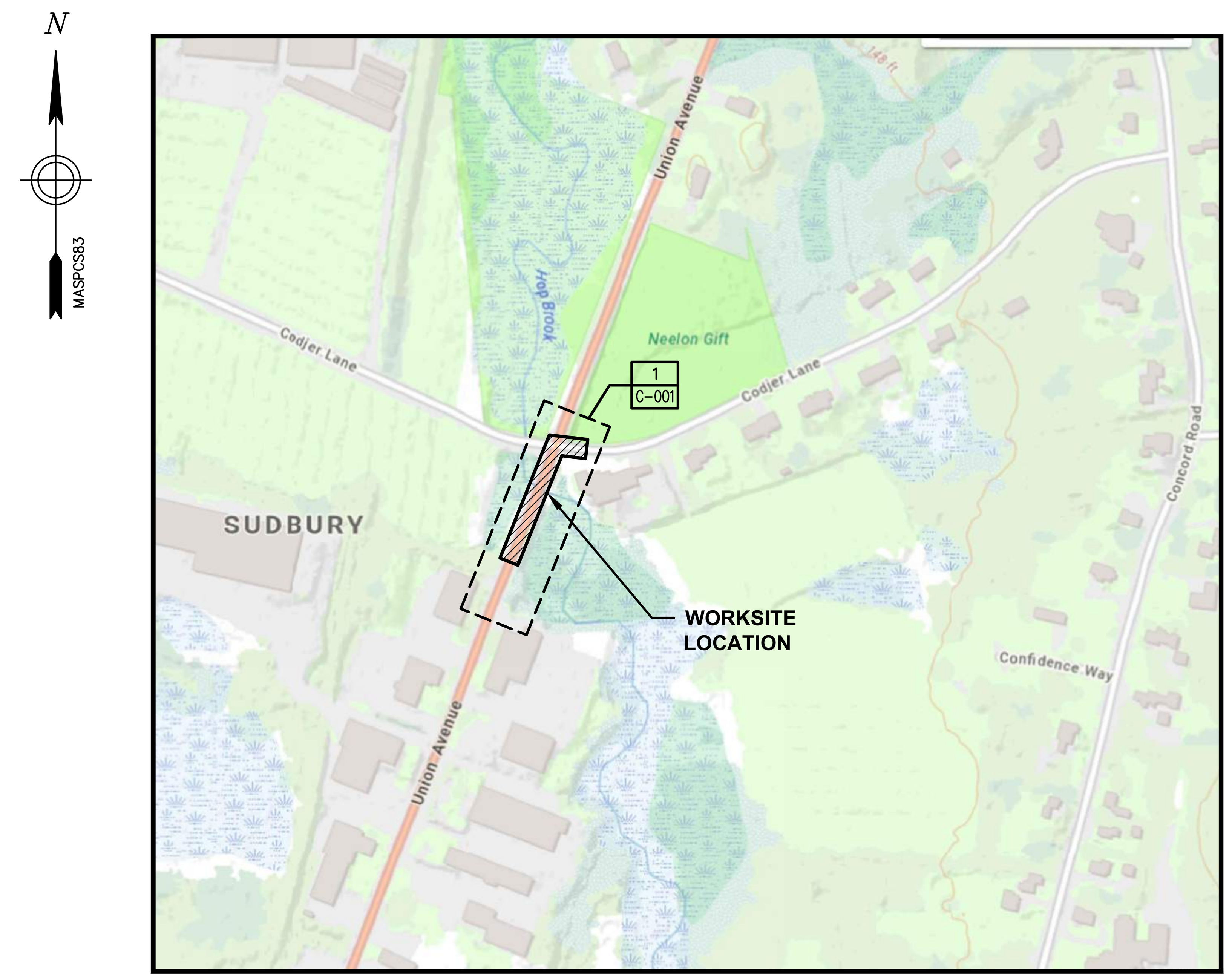
7KLVPDSFRPSOLHVZLWK)(0$
V VWDQGDUGVIRUWKHXVHRI GLJLWDOIORRGPDSVLILWLVQRWYRLGDVGHVFULEHGEHORZ 7KHEDVHPDSVKRZQFRPSOLHVZLWK)(0$
V EDVHPDS DFFXUDF\VWDQGDUGV

7KHIORRGKD]DUGLQIRUPDWLRQLVGHULYHGGLUHFWO\IURPWKH DXWKRULWDWLYH1)+/ZHEVHUYLFHVSURYLGHGE\)(0$7KLVPDS ZDVH[SRUWHGRQ DW 30 DQGGRHVQRW UHIOHFWFKDQJHVRUDPHQGPHQWVVXEVHTXHQWWRWKLVGDWHDQG WLPH7KH1)+/DQGHIIHFWLYHLQIRUPDWLRQPD\FKDQJHRU EHFRPHVXSHUVHGHGE\QHZGDWDRYHUWLPH

7KLVPDSLPDJHLVYRLGLIWKHRQHRUPRUHRIWKHIROORZLQJPDS HOHPHQWVGRQRWDSSHDUEDVHPDSLPDJHU\IORRG]RQHODEHOV OHJHQGVFDOHEDUPDSFUHDWLRQGDWHFRPPXQLW\LGHQWLILHUV),50SDQHOQXPEHUDQG),50HIIHFWLYHGDWH0DSLPDJHVIRU XQPDSSHGDQGXQPRGHUQL]HGDUHDVFDQQRWEHXVHGIRU UHJXODWRU\SXUSRVHV

%DVHPDS,PDJHU\6RXUFH8661DWLRQDO0DS

PROPOSED GAS MAIN REPLACEMENT
APPROXIMATELY 300' OF 4" PLASTIC - 60 PSIG
VIA HDD METHOD
81 UNION AVENUE & CODJER LANE, SUDBURY, MA
W.O. NO. 1469826



LOCUS
SCALE: NTS

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2	DPL-SUD-067813-1231	G-002	CONSTRUCTION NOTES AND BOM
3	DPL-SUD-067813-1231	C-001	PROPOSED INSTALLATION PLAN
4	DPL-SUD-067813-1231	C-201	PROPOSED TIE-IN DETAILS
5	DPL-SUD-067813-1231	C-301	NATIONAL GRID STANDARD CONSTRUCTION DETAILS
6	DPL-SUD-067813-1231	C-302	NATIONAL GRID STANDARD CONSTRUCTION DETAILS
7	DPL-SUD-067813-1231	C-303	NATIONAL GRID STANDARD CONSTRUCTION DETAILS
8	DPL-SUD-067813-1231	C-304	NATIONAL GRID STANDARD CONSTRUCTION DETAILS

CHA
CHA Project No. 067813

811 DigSafe MA·ME·NH·RI·VT

6/29/2023

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF APPLICABLE STATE AND/OR LOCAL LAWS

CHA
141 Longwater Drive, Suite 104
Norwell, MA 02061-1620
781-982-7700 . www.chacompanies.com

NO.	DESCRIPTION	DATE	DR.BY	CK.BY	APP.BY
2	INCORPORATED CLIENT COMMENTS (DATED 06/26/2023)	6/29/2023	APJ	PMP	GWP
1	INCORPORATED CLIENT COMMENTS DATED 03/21/2023	03/22/2023	APJ	PMP	GWP
0	ISSUED FOR CONSTRUCTION	08/06/2022	SAM	TM	GWP

BOSTON GAS COMPANY
d/b/a
nationalgrid
170 DATA DRIVE
WALTHAM, MA 02451

FINAL

PROPOSED GAS MAIN REPLACEMENT
81 UNION AVE
SUDBURY, MA

COVER SHEET

DWG SIZE	DESIGNER	ENGINEER	DATE:	ASSET I.D.	W.O. NO.:
22"X34"	S. MARTIN	T. MARRI	08/06/2022	DISTRIBUTION	1469826

PAGE 1 OF 8

DRAWING NO.	SHEET NO.
DPL-SUD-067813-1231	G-001

File: V:\PROJECTS\ANY\K5\067813.000\09_DESIGN\DRAWINGS\CIVIL\067813-1231.DWG
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CONSTRUCTION NOTES

SCOPE OF WORK

NATIONAL GRID WORK ORDER NUMBER 1469826:
(UNION AVENUE & CODJER LANE, SUDBURY, MA)

THIS WORK IS PART OF THE BRIDGES PROGRAM. THE MAIN ON THE SIDE OF THE CULVERT AT THIS LOCATION IS RECOMMENDED TO BE REPLACED. ENGINEERING RECOMMENDS THE FOLLOWING:

ABANDON APRX 220 FEET OF 3 INCH 60 PSIG PLASTIC AND APRX 50 FEET OF 3 INCH 60 PSIG CS EXPOSED AT THE CULVERT CROSSING WITH APRX 300 FEET OF 4 INCH 60 PSIG PLASTIC VIA A COMBINATION OF OPEN CUT AND HORIZONTAL DIRECTIONAL DRILLING (HDD). REMOVE APRX 31 FEET OF 3 INCH 60 PSIG CS EXPOSED AT THE CULVERT CROSSING 2

BILLING: 2 MAIN CONNECTIONS, 2 CUT & CAPS

GENERAL

1. NO FIELD CHANGES SHALL BE MADE TO THIS DESIGN WITHOUT APPROVAL FROM THE ASSIGNED NATIONAL GRID ENGINEER
   ENGINEER: BRENDAN GALLAGHER
   PHONE: (774) 813-7488
   EMAIL: BRENDAN.GALLAGHER1@NATIONALGRID.COM
2. NEW MAINS SHALL BE INSTALLED IN ACCORDANCE WITH THE TYPICAL TRENCH DETAIL INCLUDED IN THESE DRAWINGS, UNLESS NOTED OTHERWISE.
   A. 36 INCHES OF COVER FROM FINAL GRADE WHERE PRACTICAL
   B. STATE HIGHWAY MINIMUM COVER: 36 INCHES
   C. DISTRIBUTION MAIN MINIMUM COVER: 24 INCHES
   D. SAND PADDING IN ALL DIRECTIONS, 6 INCHES MINIMUM
   E. CAUTION TAPE SHALL BE INCLUDED ONE FOOT BELOW GRADE
3. SERVICES SHALL BE INSTALLED WITH 24 INCHES OF COVER
   A. MINIMUM IN PUBLIC ROW: 18 INCHES
   B. MINIMUM IN PRIVATE PROPERTY: 12 INCHES
   C. SAND PADDING IN ALL DIRECTIONS, 6 INCHES MINIMUM
   D. CAUTION TAPE SHALL BE INCLUDED ONE FOOT BELOW GRADE
4. REFER TO CNST-6030 FOR SHALLOW MAINS. PRIOR TO INSTALLING GAS MAINS WITH LESS THAN 24 INCHES OF COVER, COMPLETE REQUEST FOR WAIVER FORM AND CONTACT GAS PIPELINE SAFETY & COMPLIANCE FOR APPROVAL:
   A. JENNIFER GILLIS – (617) 594-5157 (MA EXCLUDING CAPE AND WEBSTER)
   B. LIEN GAUTHIER – (617) 438-9069 (MA EXCLUDING CAPE AND WEBSTER)
   C. IF A PROPOSED TOP TEE CONNECTION RESULTS IN A SHALLOW MAIN THAT CANNOT MEET THE WAIVER CRITERIA, A FULL TEE CONNECTION IS AN ACCEPTABLE ALTERNATIVE. A SPHERICAL TEE IS ONLY ACCEPTABLE WITH APPROVAL FROM NATIONAL GRID STRATEGIC ASSET AND SYSTEM PLANNING.
5. ALL MAINS SHOULD BE INSTALLED WITH CLEARANCE OF 12 INCHES FROM OTHER FACILITIES.
   A. DISTRIBUTION MINIMUM CLEARANCE: 6 INCHES
   B. APPROPRIATE PROTECTIVE MEASURES SHALL BE USED TO PROTECT THE GAS FACILITY IF MINIMUMS CANNOT BE ATTAINED. APPROVAL IS REQUIRED BY GAS SYSTEMS ENGINEERING.
6. THE PIPE ALIGNMENT IS SHOWN FOR REFERENCE ONLY AS APPROXIMATELY 3 FEET FROM THE EXISTING MAIN (BASED ON AVAILABLE RECORD INFORMATION). THE ACTUAL ROUTE AND ALL VERTICAL AND HORIZONTAL OFFSETS ARE TO BE FIELD ROUTED WITHIN THE PUBLIC RIGHT-OF-WAY BASED ON THE ACTUAL LOCATION OF EXISTING UTILITIES. ADDITIONAL FITTINGS NOT SHOWN WILL BE REQUIRED.
   A. ELBOWS SHOWN ARE ASSUMED TO BE 45 DEGREES IN MOST APPLICATIONS. 90 DEGREE ELBOWS MAY BE NEEDED BASED ON FIELD CONDITIONS.
7. VALVES DEPICTED IN THE DESIGN ARE THE MINIMUM REQUIRED FOR SECTIONALIZING, ISOLATION, CRITICAL VALVES, AND/OR TO ACCOMMODATE TIE-INS. ADDITIONAL FULL PORT VALVES MAY BE ADDED TO ACCOMMODATE CONSTRUCTION.
   A. VALVES FOR BRANCHES AT INTERSECTIONS SHOULD BE FIELD LOCATED JUST OUTSIDE OF THE INTERSECTION WHERE EASILY ACCESSIBLE, PRIOR TO THE FIRST SERVICE.
8. ELECTROFUSION COUPLINGS MAY BE INTERCHANGED WITH BUTT FUSION WHERE APPLICABLE.
9. TIE-IN LOCATIONS MAY VARY UP TO 100 FEET OF THE PROPOSED LOCATION TO ACCOMMODATE CONSTRUCTION, EXCEPT FOR WHEN THE FOLLOWING CONDITIONS APPLY:
   A. REGULATOR STATION IS WITHIN THE SCOPE OF THE JOB OR WITHIN 200 FEET OF THE TIE-IN LOCATION
   B. CHANGE TO THE NUMBER OF CONNECTIONS (ADDITIONAL ADDED FROM AN INTERSECTION OR OTHERWISE)
   C. MATERIAL/SIZE CHANGE AT NEW LOCATION
10. NOT ALL BYPASSES, GAUGES, PURGES AND OTHER MISCELLANEOUS FITTINGS ARE SHOWN. CONSTRUCTION SHALL INSTALL THESE FITTINGS AS NEEDED IN ACCORDANCE WITH THE APPROVED SOP.
11. WHEN CONNECTING NEW "DEAD" MAIN TO NEW "DEAD" MAIN: AS LONG AS THE CONNECTION BRANCH SIZE SHOWN IN THE DRAWINGS CAN BE ACHIEVED, THE FOLLOWING CONNECTION TYPES ARE ACCEPTED AND INTERCHANGEABLE.
   A. INLINE TEE
   B. PLASTIC HIGH VOLUME TAPPING TEE (2" BRANCH SIZE OR LESS)
   C. PLASTIC BRANCH SADDLE (WITH MAIN CUTTER SIZE SHOWN IN NATIONAL GRID POLICIES)
   D. STEEL THREE-WAY TEE (WITH MAIN CUTTER SIZE SHOWN IN NATIONAL GRID POLICIES)
12. THE LIVE MAIN CONNECTION DETAIL SHOWN IN THE DRAWINGS SHALL BE FOLLOWED. ANY CHANGES TO THE TIE IN CONNECTION TYPE SHALL BE APPROVED BY THE NATIONAL GRID ENGINEER PRIOR TO CONSTRUCTION.
13. ALL CUSTOMER SERVICES WITHIN THE SCOPE OF MAIN TO BE ABANDONED SHALL BE TRANSFERRED OR RELAYED BY THE CONTRACTOR TO THE NEW MAIN PRIOR TO ABANDONMENT. WHEN RELAYING A LOWER PRESSURE MAIN WITH A HIGHER PRESSURE MAIN, ALL SERVICES SHALL BE RELAYED OR INSERTED.
14. DRESSER STYLE COMPRESSION FITTINGS ON PLASTIC MAY BE USED AS AN ALTERNATIVE TO ELECTROFUSION FITTINGS ON PLASTIC TO PLASTIC PIPE CONNECTIONS PROVIDED THAT THE COUPLINGS ARE:
   i) MADE FOR PLASTIC TO PLASTIC APPLICATIONS.
   ii) PULL-OFF RESISTANT.
   iii) INSTALLED WITH AN APPROPRIATELY SIZED ANODE ATTACHED. THE SAME STYLE COUPLING MAY BE USED AS A PERMANENT LINE CAP PROVIDED THAT THE CORRECT FACTORY END PLATE IS UTILIZED AS AN ALTERNATIVE TO A FUSED END PLASTIC END CAP.
   iv) DRESSER STYLE CAPS AND PERMASERT CAPS ARE INTERCHANGEABLE WITH FUSION CAPS, PROVIDED CATHODIC PROTECTION REQUIREMENTS ARE USED FOR METALLIC BOLT STYLE FITTINGS REMAINING IN SERVICE.
15. FOR HOST STEEL MAIN CONNECTIONS: IN LIEU OF THE USE OF TDW 3-WAY TEE FITTINGS. ESPECIALLY WHERE INSUFFICIENT COVERAGE PROHIBITS THEIR USE, A MUELLER WELD ON BOTTOM-OUT FITTING OR A TDW SPHERICAL 3-WAY TEE CAN BE USED FOR STOP OFF/TAKE OFF APPLICATIONS. A TDW SHORTSTOPP FITTING CAN ALSO BE USED AS AN ALTERNATIVE, BUT REQUIRES ANALYSIS FOR BYPASS ETC. NATIONAL GRID SYSTEM PLANNING SHALL REVIEW AND APPROVE THE USE OF AN ALTERNATIVE FITTING. A PULL OUT RESISTANT COUPLING MUST BE USED FOR THE CONNECTION OF THE NEW MAIN TO THE HOST MAIN.
16. FOR HOST CAST IRON MAIN CONNECTIONS: IN LIEU OF THE USE OF TDW 3-WAY TEE FITTINGS, WELDED ON A DRESSER STYLE 50A REPAIR SLEEVE, ESPECIALLY WHERE INSUFFICIENT COVERAGE PROHIBITS THEIR USE, AN INLINE TEE CAN BE SUBSTITUTED IN CONJUNCTION WITH EITHER A TDW SHORTSTOPP FITTING WELDED ON TOP OF A DRESSER STYLE 50A REPAIR SLEEVE, TDW SHORTSLEEVES, OR A MUELLER MECHANICAL STOP OFF FITTING CAN BE USED BUT REQUIRES ANALYSIS FOR BYPASS ETC. NATIONAL GRID GAS SYSTEM PLANNING SHALL REVIEW AND APPROVE THE USE OF AN ALTERNATIVE FITTING. A PULL OUT RESISTANT COUPLING MUST BE USED FOR THE CONNECTION OF THE NEW MAIN TO THE HOST MAIN.
17. ON NEW PLASTIC TO EXISTING STEEL CONNECTIONS, IN-LINE TIE-INS USING A STOP-OFF FITTING AND A PULLOUT RESISTANT DRESSER STYLE COUPLING IS INTERCHANGEABLE WITH USING A TDW 3-WAY TEE, AN ELBOW AND A PLASTIC TO STEEL TRANSITION FITTING ON A HIGH PRESSURE DISTRIBUTION MAIN OR SERVICE.
18. STEEL MUELLER ANSI 150 CLASS FITTINGS ARE INTERCHANGEABLE WITH TDW FITTINGS OF 150 POUND CLASS PROVIDED THAT THEY ARE THE SAME SIZE AND CAN PROVIDE THE SAME FUNCTION IN A SAFE MANNER IN ACCORDANCE TO THE MANUFACTURER'S SPECIFICATIONS.
19. PLASTIC INLINE TEES AND BRANCH SADDLES ARE INTERCHANGEABLE PROVIDED THE SADDLE IS THE EQUIVALENT SIZE OF THE TEE INCLUDING REDUCERS AND TAPPED OUT TO THE MAXIMUM SIZE ALLOWED BY THE MANUFACTURER.
20. FOR A 2" PLASTIC TIE-IN TO AN EXISTING 2" PLASTIC PIPE, EITHER A 2" HVT OR A STRAIGHT BUTT CONNECTION ARE ACCEPTABLE ALTERNATIVES PROVIDED THERE ARE NO ONE WAY FEED ISSUES.
21. BUTT FUSE PLASTIC CAPS, WITH OR WITHOUT ELECTROFUSION COUPLINGS, MAY BE USED IN LIEU OF ELECTROFUSION CAPS AS NEEDED. 2
22. CONTRACTOR SHALL CALL DIGSAFE (DIAL 811 OR 888-344-7233) AT LEAST 72 HOURS PRIOR TO CONSTRUCTION. SATURDAYS. SUNDAYS, AND HOLIDAYS ARE EXCLUDED.
23. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UTILITIES AND STRUCTURES DEPICTED OR NOT DEPICTED ON THIS DESIGN PRIOR TO CONSTRUCTION.

CODES & STANDARDS

1. WORK SHALL CONFORM TO ALL LOCAL, STATE, AND FEDERAL CODES IN ADDITION TO NATIONAL GRID GAS POLICIES AND WORK METHODS. WHERE ANY CONFLICTS OF CODES, STANDARDS, AND REGULATIONS MAY EXIST, THE MORE STRINGENT CODE, STANDARD, OR REGULATION SHALL APPLY.
2. ALL REFERENCES SHALL BE IN ACCORDANCE WITH THE MOST CURRENT REVISION AVAILABLE AT THE TIME OF CONSTRUCTION
3. FEDERAL & STATE
   A. TITLE 49: PART 192 TRANSPORTATION OF NATURAL AND OTHER GAS BY PIPELINE: MINIMUM FEDERAL SAFETY STANDARDS
   B. 220 CMR: DEPARTMENT OF PUBLIC UTILITIES
      100.00 – 113.00: MASSACHUSETTS GAS DISTRIBUTION CODE
   C. AMERICAN SOCIETY OF MECHANICAL ENGINEERS
      B31.8: GAS TRANSMISSION AND DISTRIBUTION PIPING SYSTEMS
4. CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH NATIONAL GRID GAS POLICIES AND WORK METHODS, INCLUDING BUT NOT LIMITED TO:
   A. CNST01003: BACKFILL AND RESTORATION
   B. CNST01005: PREPARATION OF GAS FACILITY HISTORICAL RECORDS
   C. CNST01006: COMMERCIALLY AVAILABLE SHORING SYSTEMS
   D. CNST02014: ENCAPSULATING CAST IRON JOINTS
   E. CNST03001: SQUEEZE-OFF OPERATIONS
   F. CNST03002: STOP-OFF OPERATIONS ON LOW PRESSURE MAINS
   G. CNST03005: PURGING REQUIREMENTS FOR GAS PIPELINES
      I) CNST03006: PURGING OPERATIONS – DIRECT REPLACEMENT
      II) CNST03007: PURGING OPERATIONS – COMPLETE INERT FILL
      III) CNST03008: PURGING OPERATIONS – SLUG METHOD
   H. CNST03014: STOP OFF OPERATIONS FOR KLEISS EQUIPMENT
   I. CNST04005: INSTALLING STEEL DISTRIBUTION MAINS
   J. CNST04007: FIELD COLD BENDING OF LINE PIPE
   K. CNST04008: INSTALLING PLASTIC MAINS
   L. CNST04011: ABANDONMENT OF MAINS
   M. CNST04012: GROUTING ABANDONED PIPELINES
   N. CNST04030: RAISING MAIN AND SERVICE GATE BOXES
   O. CNST05001: JOINING OF PLASTIC PIPE
   P. CNST05011: INSTALLATION OF DRESSER 700 COUPLINGS
   Q. CNST5010: GENERAL CONSTRUCTION REQUIREMENTS AND PIPE HANDLING
   R. DAM01011: EXCAVATION AND EXCAVATION NOTIFICATION REQUIREMENTS FOR UNDERGROUND FACILITIES FOR MASSACHUSETTS AND RHODE ISLAND
   S. DAM01015: LOCATE AND MARKOUT REQUIREMENTS FOR UNDERGROUND GAS FACILITIES
   T. DAM01016: LOCATE AND MARK OUT OF UNDERGROUND FACILITIES
   U. GCON02001: SYSTEM OPERATING PROCEDURE (SOP)
   V. GEN01100: OPERATOR QUALIFICATION PLAN
   W. GEN03002: PROCESSING GAS MAIN AND NEW SERVICE WORK PACKAGES
   X. GEN03004: CHANGE CONTROL PROCEDURE FOR STANDARD CONSTRUCTION PROJECTS
   Y. INR06002: SUPPLEMENTAL ODORIZATION FOR NEW PIPING
   Z. MAIN5030: INSTALLATION OF POLYETHYLENE PIPE
   AA. MECH5010: JOINTS OTHER THAN WELDED
   AB. 030018-CS SPECIFICATION AND HANDLING OF TRAFFIC PLATES
   AC. DAM01008: CAST IRON ENCROACHMENT POLICY FOR MASSACHUSETTS AND RHODE ISLAND
   AD. CS-CNST002-MA: TYPICAL UTILITY CROSSING AND TRENCH GUIDELINES
   AE. CS-MAIN004: PRESSURE TESTING OF NEW MAINS MAOP OF 124 PSIG OR LESS
   AF. CNST6061: TRACER WIRE INSTALLATIONS FOR PLASTIC MAINS AND SERVICES
   AG. CS-LIVE002: TEMPORARY BYPASSES ON PLASTIC, CAST IRON OR STEEL MAINS
   AH. MECH6010: CONNECTION OF DISSIMILAR POLYETHYLENE PLASTIC PIPE WITH ELECTROFUSION OF MECHANICAL COUPLING
   AI. MECH6030: CONNECTION OF DISSIMILAR POLYETHYLENE PLASTIC PIPE WITH MECHANICAL COUPLING – ALTERNATE
   AJ. PURG6040: TYPICAL NITROGEN PURGE ARRANGEMENT
   AK. VALV6020: 2 IN. – 12 IN. POLYETHYLENE VALVE INSTALLATIONS ON GAS MAIN
   AL. FITS6370: VALVE BOXES UP TO 8 IN. VALVES AND ALL RISER RINGS
   AM. CNST01001: HORIZONTAL DIRECTIONAL DRILLING
5. SERVICE SPECIFIC GAS POLICIES AND WORK METHODS
   A. CMS03002: CUSTOMER METER AND SERVICE REGULATOR DESIGN AND INSTALLATION POLICY
   B. CMS04002: PURGING PROCEDURES FOR CUSTOMER METER SERVICES
   C. CNST03011: NO-INTERRUPT SERVICE TRANSFER
   D. CNST06002: INSTALLING DISTRIBUTION SERVICES
   E. CNST06003: INSTALLATION & MAINTENANCE POLICY FOR CURB VALVES ON SERVICE LINES WITH INSTALLED METER CAPACITIES OVER 1000 SCFH THAT DON'T HAVE EXCESS FLOW VALVES
   F. CNST06009: METER/SERVICE RELOCATION GUIDELINE
   G. CNST06020: COMPLETION AND PROCESSING OF GAS SERVICE RECORD CARDS
   H. CNST06030: NOTIFICATION OF CUSTOMERS INVOLVED IN THE INTERRUPTION OF GAS SERVICES
   I. CS-SERV001: TYPICAL 1/2" SERVICE OUTSIDE SETS
   J. CS-SERV002: TYPICAL 1" SERVICE OUTSIDE SETS
   K. CS-SERV003: TYPICAL 1-1/4" SERVICE OUTSIDE SETS
   L. CS-SERV004: TYPICAL 2" SERVICE
   M. CS-SERV005: EXCESS FLOW VALVE REQUIREMENTS ON HP SERVICES
   N. CS-SERV009: TYPICAL 1/2" SERVICE INSIDE SETS
   O. CS-SERV010: TYPICAL 1" SERVICE INSIDE SETS
   P. HTAP-6010: NO-INTERRUPT 1 INCH CTS AND 1-1/4 INCH CTS SERVICE TRANSFER (NIST) LP TO 60 PSIG MAINS
   Q. SERV-5075: RELOCATION OF METER SET ASSEMBLIES INSIDE TO OUTSIDE
   R. SERV-6185: HOT TAPPING MD BRANCH SADDLES OFF 4IN – 12IN 60 PSIG
   S. VALV6110: 1/2 INCH – 3 INCH POLYETHYLENE GAS SERVICE VALVE INSTALLATION
6. SEE TIE IN DETAILS FOR APPLICABLE MAIN CONNECTION REFERENCES
7. SEE BILL OF MATERIAL FOR MATERIAL SPECIFICATION, STANDARD AND/OR APPLICABLE NATIONAL GRID "FITS" REFERENCE
   A. FOR THIS PROJECT, GRADE B, X42, X52 AND EQUIVALENT ARE ACCEPTABLE STEEL MATERIAL STRENGTHS IF APPLICABLE. ALTERNATES TO THE BOM ARE ALLOWED WITHIN THIS RANGE BASED ON MATERIAL AVAILABILITY.

DESIGN CRITERIA

1. DESIGN IN ACCORDANCE WITH THE FOLLOWING:
   A. ENG02001: DESIGN OF GAS SERVICES
   B. ENG04001: DESIGN OF DISTRIBUTION MAINS
   C. ENG04010: DESIGN REQUIREMENTS FOR INSTALLATION OF CASINGS
2. PROPOSED PIPING:
   A. DESIGN CLASS LOCATION – 4
   B. NOMINAL SIZE – 4 INCH
   C. MATERIAL – MDPE & HDPE
   D. SYSTEM MAOP – 60 PSIG
3. PIPE SIZING DETERMINED BY NATIONAL GRID STRATEGIC ASSET AND SYSTEM PLANNING
4. BYPASS REQUIREMENTS FOR ALL MAIN CONNECTIONS TO BE DETERMINED BY NATIONAL GRID OPERATIONS ENGINEERING AND IMPLEMENTED IN ACCORDANCE WITH THE SOP PROCESS.
5. FOR WORK ORDERS PERTAINING TO ENCROACHMENTS, NATIONAL GRID SHALL DETERMINE IN THE FIELD THE EXACT LOCATION OF THE ENCROACHMENT TO ENSURE THE REPLACEMENT COMPLIES WITH DAM01008 AND REMOVES ANY POTENTIAL HAZARD CREATED BY THE ENCROACHMENT.

PROJECT CONSTRUCTION REQUIREMENTS

1. PER NATIONAL GRID GAS POLICY DOC# ENG05004, ALL COMPLEX PROJECTS ARE REQUIRED TO PREPARE AN SOP IN ACCORDANCE WITH THE STAMPED PLANS, WHICH MUST BE APPROVED BY A PROFESSIONAL ENGINEER. THE SOP MUST INCLUDE ALL PROPOSED PROJECT SPECIFIC STEPS AND PROCEDURES TO DEFINE AN ADEQUATE SEQUENCE FOR CONSTRUCTION OF THE MAIN.

2. IN ACCORDANCE WITH MASSACHUSETTS 220 CMR 105.00, THE STAMPED SOP IS CONSIDERED PART OF A REQUIRED PROJECT SPECIFIC PACKAGE TO PERFORM ANY COMPLEX PROJECT CONSTRUCTION. THEREFORE, FOR ANY COMPLEX PROJECT CONSTRUCTION WORK, THE CONTRACTOR MUST FOLLOW THE PE STAMPED SOP.

PRESSURE TESTING

1. PRESSURE TESTING TO BE IN ACCORDANCE WITH:
   A. CNST04003: PRESSURE TESTING MAINS OPERATING BELOW 125 PSIG.
   B. TEST PRESSURE (MINIMUM): 90 PSIG
   C. TEST DURATION BASED ON LENGTH AND DIAMETER IN ACCORDANCE WITH TABLE 1
   D. TEST MEDIUM: AIR AND/OR NITROGEN
   E. CS-MAIN004: PRESSURE TESTING OF NEW MAINS MAOP OF 124 PSIG OR LESS
2. PRESSURE TEST SERVICES IN ACCORDANCE WITH:
   A. CNST06008: PRESSURE TESTING SERVICE LINES

WELDING

1. NATIONAL GRID WELDING GAS POLICIES AND WORK METHODS INCLUDE:
   A. CNST05002: WELDING POLICY
   B. CNST05003: PIPE WELDING SAFETY
   C. CNST05005: WELDING PROCEDURE SPECIFICATIONS
   D. MS-030: WELDING FILLER MATERIALS
2. PRIOR TO THE START OF ANY WORK THE CONTRACTOR SHALL SUBMIT WELDER CERTIFICATION DOCUMENTS FOR EACH OF THE WELDERS EMPLOYED ON THIS PROJECT.
3. WELDING PROCEDURE SPECIFICATIONS REQUIRED
   A. BUTT WELDS (GROOVE): WPS-SMAW-E6010/7010 (LATEST REVISION)
   B. FILLET WELDS (BRANCH): WPS-SMAW-E6010/7010 (LATEST REVISION)
4. 10% (AT LEAST 1) OF WELDS IN EACH CATEGORY BELOW SHALL BE SUBJECT TO NON-DESTRUCTIVE EXAMINATION (NDE).
   A. BUTT WELDS 2-INCH AND GREATER: 10% RADIOGRAPH
   B. BUTT WELDS < 2-INCHES: 10% MAGNETIC PARTICLE
   C. FILLET WELDS: 10% MAGNETIC PARTICLE
5. NDE AND WELD MAP SHALL BE PROVIDED BY SKYTESTING
6. SKYTESTING SCHEDULING CONTACT:
   WILLIAM (BILL) CLARK
   CELL: (704) 858-7794
   EMAIL: WCLARK@SKYTESTING.COM

CATHODIC PROTECTION

1. IF EXISTING TEST STATIONS, WIRES, AND/OR MAGNESIUM ANODES ARE DISTURBED OR DAMAGED, NOTIFY THE NATIONAL GRID CORROSION DEPARTMENT:
   DAVE HALNEN: (781) 379-7831
   ALANNA GRONDINE: (339) 225-5378
2. 24 HOUR NOTICE IS REQUIRED PRIOR TO INSTALLATION OF INSULATED FITTINGS TO ALLOW FOR ACCEPTANCE TESTING
3. CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH NATIONAL GRID CORROSION GAS POLICIES AND WORK METHODS INCLUDING:
   A. COR01100: CORROSION DESIGN CRITERIA
   B. COR02001: APPLICATION OF COATING SYSTEMS
   C. COR02020: INSPECTING EXPOSED STEEL PIPE FOR CORROSION
   D. COR02021: INSPECTING EXPOSED CAST OR DUCTILE PIPING FOR GRAPHITIZATION
   E. COR03001: TESTING OF PIPE COATING (JEEP TESTING)
   F. COR04001: INSTALLATION OF MAGNESIUM ANODES
   G. COR04003: INSTALLATION OF TEST STATIONS FOR CATHODIC PROTECTION
   H. COR04004: INSTALLATION OF WIRE CONNECTION
   I. COR04005: INSTALLATION OF INSULATING JOINTS FOR CATHODIC PROTECTION
   J. 030031-CS: FACILITY COATING GUIDE
   K. 030024-CS: INSTALLATION OF MAGNESIUM ANODES
   L. 030026-CS: INSTALLATION OF TEST STATIONS FOR CATHODIC PROTECTION
   M. 030016-CS: ELECTRICAL ISOLATION REQUIREMENTS OF A METALLIC COUPLING INSTALLED TO TIE IN A PLASTIC PIPE TO A METALLIC PIPE
   N. 030028-CS: INSTALLATION OF INSULATING JOINTS FOR CATHODIC PROTECTION
   O. 030036-CS: INSTALLING WIRE CONNECTIONS
4. CORROSION DESIGN: SEE CONTENTS OF THIS DESIGN FOR CATHODIC PROTECTION DETAILS.

ENVIRONMENTAL

1. WORK SHALL CONFORM TO THE NATIONAL GRID ENVIRONMENTAL POLICY.
2. ENVIRONMENTAL ENGINEERING CONTACT
   JAIME WALKER
   PHONE: (978) 551-1156
   EMAIL: JAIME.WALKER@NATIONALGRID.COM
3. CONTRACTOR SHALL REVIEW THE PROJECT WORK ORDER PACKAGE FOR THE ENVIRONMENTAL GUIDANCE FORMS, FOR EXAMPLE EG-301, FOR THE RESPECTIVE STATE.
4. WHEN SOILS OR LIQUIDS ARE ENCOUNTERED THAT ARE BELIEVED TO BE CONTAMINATED WITH OIL AND/OR HAZARDOUS MATERIAL, EXCAVATION WORK SHALL BE HALTED AND FIELD PERSONNEL SHALL NOTIFY THEIR IMMEDIATE SUPERVISOR.
5. NO EXCAVATED SOIL SHALL LEAVE THE WORK SITE UNTIL ENVIRONMENTAL HAS MADE A DETERMINATION FOR ITS PROPER DISPOSAL.
6. NATIONAL GRID ENVIRONMENTAL POLICIES AND PROCEDURES INCLUDE:
   A. SHE02001: HANDLING CONTAMINATED MATERIALS AND PIPING
   B. SHE02002: REMOVING MERCURY REGULATORS AND DEVICES
   C. SHE02003: ENCOUNTERING CONTAMINATION WHILE EXCAVATING
   D. EG303-NE: BEST MANAGEMENT PRACTICES
   E. EG140: USED GAS PIPE MANAGEMENT
7. ENVIRONMENTAL REQUIREMENTS: PROPOSED WORK IS LOCATED WITHIN 100 FEET OF WETLANDS AND/OR BODIES OF WATER / WITHIN 200 FEET OF A RIVER OR A STREAM (*25 FEET IN BOSTON, BROCKTON, CAMBRIDGE, CHELSEA, EVERETT, FALL RIVER, LAWRENCE, LOWELL, MALDEN, NEW BEDFORD, SOMERVILLE, SPRINGFIELD, WINTHROP OR WORCESTER)/ WITHIN A FLOODPLAIN. ENVIRONMENTAL PERMIT AND/OR THE USE OF ENVIRONMENTAL BMPS MAY BE REQUIRED. SEE ENVIRONMENTAL MEMO FOR DETAILS.

SAFETY

1. WORK SHALL CONFORM TO THE NATIONAL GRID EMPLOYEE SAFETY HANDBOOK AND OSHA REQUIREMENTS
2. REQUIRED PPE SHALL BE WORN AND UTILIZED IN ACCORDANCE WITH THE CURRENT NATIONAL GRID SAFETY POLICY.
3. A NATIONAL GRID APPROVED CONTRACTOR HEALTH AND SAFETY PLAN (HASP) IS REQUIRED PRIOR TO CONSTRUCTION.
4. CONSTRUCTION SIGNING, DRUMS, BARRICADES, AND OTHER DEVICES SHALL CONFORM TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D.) PART VI AND SHALL BE MAINTAINED BY THE CONTRACTOR.
5. NATIONAL GRID SAFETY POLICIES AND PROCEDURES INCLUDE:
   A– ADMINISTRATIVE — B– INSPECTIONS
   C– WALKING WORKING SURFACES — D– MEANS OF EGRESS
   E– MATERIAL HANDLING AND STORAGE — F– TOXIC AND HAZARDOUS SUBSTANCES
   G– HAZARDOUS MATERIALS — H– PERSONAL PROTECTIVE EQUIPMENT
   I– GENERAL ENVIRONMENTAL CONTROLS — J– ACCIDENT INVESTIGATION
   K– MACHINERY AND GUARDING — L– WELDING/CUTTING/BRAZING
   M– EXCAVATIONS — N– CONTRACTORS
   FIRE PROTECTION — Q– FLEET AND ROADWAY SAFETY
6. GAS WORK METHODS SAFETY PROCEDURES INCLUDE:
   A. SHE01001: GENERAL SAFETY REQUIREMENTS
   B. SHE01002: SUPPLIED-AIR RESPIRATORS
   C. SHE01003: USING AND MAINTAINING PORTABLE GAS MONITORS
   D. SHE01004: USING AND MAINTAINING FLAME IONIZATION UNITS
   E. SHE01005: DISSIPATING STATIC ELECTRICAL CHARGES ON PLASTIC PIPE
   F. SHE01006: ENTERING GAS UTILITY VAULTS
   G. SHE01008: USING AND MAINTAINING THE GAS-EXPLORER
   H. SHE01009: DISSIPATING STATIC ELECTRICAL CHARGES ON PLASTIC PIPE
   I. SHE01010: THE APPLICATION OF FORMAL PROCESS SAFETY ASSESSMENTS TO HIGHER-RISK GAS ACTIVITIES PERFORMED IN THE FIELD
   J. SHE02001: HANDLING CONTAMINATED MATERIALS AND PIPING

OTHER PERMITTING REQUIREMENTS

TOWN OF SUDBURY STREET OPENING PERMIT
ENVIRONMENTAL PERMIT AND/OR THE USE OF ENVIRONMENTAL BMPS MAY BE REQUIRED

REFERENCE DRAWINGS

LOCATION OF IDENTIFIED UNDERGROUND UTILITIES ARE APPROXIMATED BASED ON AVAILABLE RECORD AND FIELD INFORMATION IN ACCORDANCE WITH CI/ASCE 38-02. ADDITIONAL UTILITIES MAY EXIST WHICH ARE NOT IDENTIFIED ON THESE PLANS. ALL EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR FOR SERVICE, SIZE, INVERT ELEVATIONS, LOCATIONS, ETC.

THE TOPOGRAPHIC AND ELEVATION DATA SHOWN HEREON WAS OBTAINED FROM MASS GIS AND SERVICE RECORDS AND IS NOT CERTIFIED AS CORRECT AND/OR ACCURATE BY THIS ENGINEER. USERS RELY ON SAID DATA AT THEIR OWN RISK.

CONSULTANT CONTACT INFORMATION

CHA CONSULTING, INC.:
JEFFREY O'DONNELL, P.E.
BUSINESS PRACTICE LEADER – GAS ENGINEERING
(781) 982-5456
JODONNELL@CHACOMPANIES.COM

BILL OF MATERIALS

ITEM	QTY	UOM	DESCRIPTION	SIZE (IN.)	NATIONAL GRID REFERENCE	SAP ID NUMBER
1	6	FT	PIPE, PLASTIC, MDPE-STRAIGHT 10'	3	120026-MS	9322708
2	80	FT	PIPE, PLASTIC, MDPE-STRAIGHT 40'	4	120026-MS	9340857
3	215	FT	PIPE, PLASTIC, HDPE-COIL 500'	4	120025-MS	9306310
4	4	EA	ELBOW, PLASTIC, MDPE, 45 DEGREE	4	CS-FIT011	9341400
5	1	EA	ELBOW, PLASTIC, MDPE, 90 DEGREE	4	CS-FIT011	9341397
6	6	EA	COUPLING, PLASTIC ELECTROFUSION	3	CS-FIT015	9307689
7	3	EA	COUPLING, PLASTIC ELECTROFUSION	4	CS-FIT015	9314593
8	2	EA	REDUCER, PLASTIC, MDPE	4 X 3	CS-FIT013	9342615
9	2	EA	VALVE, PLASTIC, FULL BORE/PORT, MDPE	4	VALV6020	9341709
10	2	EA	CAP, PLASTIC, MDPE, BUTT FUSE	3	CS-FIT010	9339541
11	2	EA	CAP, PLASTIC, HDPE, ELECTRO FUSE	3	CS-FIT015	9393583
12	2	EA	CAP, STEEL, DRESSER, SELF-RESTRAINING	3	FITS6024	9310275
GENERAL						
G1	A/R	FT	TRACER WIRE	-	CNST6061	9315005
G2	A/R	ROLL	YELLOW CAUTION TAPE - GAS MAIN - 6" WIDE	6	CNST6060	9341904
G3	2	EA	VALVE BOX ASSEMBLY	4	FITS6360	(SEE STD)

NOTE: ALL MATERIAL QUANTITIES ARE ESTIMATED BASED ON PROPOSED DESIGN. ADDITIONAL QUANTITIES AND/OR OTHER MATERIALS MAY BE REQUIRED TO CONSTRUCT VERTICAL OFFSETS OR DUE TO OTHER UNKNOWN AS-FOUND CONDITIONS/DESIGN CONFLICTS AND FOR TESTING.

COMMONWEALTH OF MASSACHUSETTS
GARY W. PAKERIANOS
CIVIL
No.52392
REGISTERED PROFESSIONAL ENGINEER
6/29/2023

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NO.	DESCRIPTION	DATE	DR.BY	CK.BY	APP.BY
2	INCORPORATED CLIENT COMMENTS (DATED 06/26/2023)	6/29/2023	APJ	PMP	GWP
1	INCORPORATED CLIENT COMMENTS DATED 03/21/2023	03/22/2023	APJ	PMP	GWP
0	ISSUED FOR CONSTRUCTION	08/06/2022	SAM	TM	GWP

BOSTON GAS COMPANY
d/b/a
nationalgrid
170 DATA DRIVE
WALTHAM, MA 02451

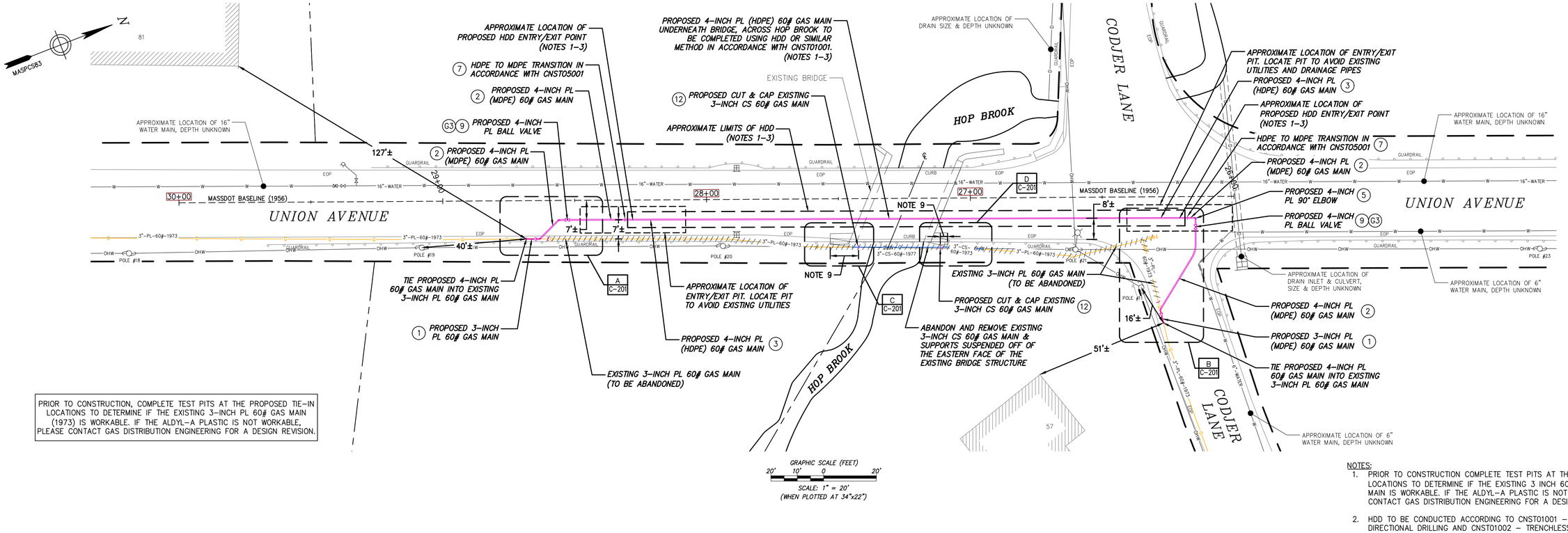
FINAL

PROPOSED GAS MAIN REPLACEMENT
81 UNION AVE
SUDBURY, MA

CONSTRUCTION NOTES AND BOM

DWG SIZE	DESIGNER	ENGINEER	DATE:	ASSET I.D.	W.O. NO.:
22"X34"	S. MARTIN	T. MARRI	08/06/2022	DISTRIBUTION	1469826

DRAWING NO.	SHEET NO.
DPL-SUD-067813-1231	G-002



PRIOR TO CONSTRUCTION, COMPLETE TEST PITS AT THE PROPOSED TIE-IN LOCATIONS TO DETERMINE IF THE EXISTING 3-INCH PL 60# GAS MAIN (1973) IS WORKABLE. IF THE ALDYL-A PLASTIC IS NOT WORKABLE, PLEASE CONTACT GAS DISTRIBUTION ENGINEERING FOR A DESIGN REVISION.

NOTES:

1. PRIOR TO CONSTRUCTION COMPLETE TEST PITS AT THE PROPOSED TIE IN LOCATIONS TO DETERMINE IF THE EXISTING 3 INCH 60# PLASTIC (1973) MAIN IS WORKABLE. IF THE ALDYL-A PLASTIC IS NOT WORKABLE, PLEASE CONTACT GAS DISTRIBUTION ENGINEERING FOR A DESIGN REVISION.
2. HDD TO BE CONDUCTED ACCORDING TO CNST01001 – HORIZONTAL DIRECTIONAL DRILLING AND CNST01002 – TRENCHLESS PIPE INSTALLATION SITE ASSESSMENT REQUIREMENTS.
3. OBTAIN ALL PROPER PERMITTING.
4. HDD CROSSING TO BE AT LEAST 5 FT BELOW FOOTINGS OF BRIDGE STRUCTURE, OR AT A SATISFACTORY DEPTH TO AVOID ANY NEGATIVE IMPACTS TO THE EXISTING BRIDGE STRUCTURE, WHICHEVER IS GREATER, AND DEPTHS SHALL BE VERIFIED AND APPROVED BY THE CONSULTANT PRIOR TO CONSTRUCTION.
5. MINIMUM BEND RADIUS OF PIPE SHALL BE BASED ON TABLE SHOWN ON THIS SHEET.
6. EXACT LOCATION OF ENTRY/EXIT POINTS TO BE DETERMINED BY DRILLER DURING CONSTRUCTION.
7. UPON COMPLETION OF HDD, ENSURE PRE-CONSTRUCTION CONDITIONS ARE RESTORED AND CONDUCT INSPECTION TO ENSURE HDD HAS NOT CONTAMINATED WATERWAY.
8. CONTACT GAS DISTRIBUTION ENGINEERING FOR ADDITIONAL DESIGN DETAILS IF THE PROPOSED LIMITS OF HDD SIGNIFICANTLY EXCEED THE ROW LIMITS AT THE INTERSECTION OF UNION AVE AND CODJER LANE.
9. CUT & CAP THE EXISTING 3-INCH CS 60# (1973/1977) GAS MAIN TO THE NORTH AND SOUTH OF THE BRIDGE STRUCTURE. ENSURE THAT THE CUT & CAP LOCATIONS ARE FAR ENOUGH NORTH AND SOUTH OF THE BRIDGE STRUCTURE TO REMOVE THE EXISTING RISER SECTIONS WHERE THE EXISTING MAIN ENTERS THE EARTH AFTER BEING SUSPENDED OFF THE EASTERN BRIDGE FACE. FIELD VERIFY EXISTING 3" CS RISERS AND TRANSITION FITTINGS ON EASTERN SIDE OF BRIDGE PRIOR TO CONSTRUCTION.

LEGEND

- PROPOSED GAS CAP
- PROPOSED GAS TRANSITION FITTING
- PROPOSED GAS REDUCER
- PROPOSED GAS VALVE
- EXISTING GAS TRANSITION FITTING
- EXISTING GAS CAP
- EXISTING GAS VALVE
- EXISTING FIRE HYDRANT
- EXISTING WATER VALVE
- EXISTING DRAIN INLET
- EXISTING UTILITY POLE
- EXISTING UTILITY POLE WITH LIGHT
- BUILDING LINE
- EASEMENT LINE
- PROPERTY LINE
- RIGHT OF WAY LINE
- EDGE OF PAVEMENT
- EDGE OF STREAM
- CURB LINE
- FENCE LINE
- GUARDRAIL (METAL)
- EXISTING OVERHEAD WIRE LINE
- EXISTING STORM DRAIN LINE
- EXISTING WATER LINE
- EXISTING CS GAS MAIN
- EXISTING PL GAS MAIN
- EXISTING GAS MAIN TO BE ABANDONED
- PROPOSED GAS MAIN

MINIMUM BEND RADIUS TABLE:

Dimension Ratio (DR)	Minimum Bend Radius*
≤ 9	20 times the pipe OD
9.8, 11, 11.5, 12.5, 13.5	25 times the pipe OD
15.3	27 times the pipe OD
Fitting or flange present in bend or within 3 feet of the start of the bend	100 times the pipe OD

Source: Plastics Pipe Institute, Chapter 7: Underground Installation of PE Piping

*Note: Due to increased stress during directional drilling, the minimum bend ratio should be no less than two times the values in the table.

SCOPE OF WORK:

THIS WORK IS PART OF THE BRIDGES PROGRAM. THE MAIN ON THE SIDE OF THE CULVERT AT THIS LOCATION IS RECOMMENDED TO BE REPLACED. ENGINEERING RECOMMENDS THE FOLLOWING:

ABANDON APRX 220 FEET OF 3 INCH 60 PSIG PLASTIC AND APRX 50 FEET OF 3 INCH 60 PSIG CS EXPOSED AT THE CULVERT CROSSING WITH APRX 300 FEET OF 4 INCH 60 PSIG PLASTIC VIA A COMBINATION OF OPEN CUT AND HORIZONTAL DIRECTIONAL DRILLING (HDD). REMOVE APRX 31 FEET OF 3 INCH 60 PSIG CS EXPOSED AT THE CULVERT CROSSING 2

COMMONWEALTH OF MASSACHUSETTS
GARY W. POWERS
No. 52392
REGISTERED PROFESSIONAL ENGINEER
6/29/2023

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FINAL

PROPOSED GAS MAIN REPLACEMENT
81 UNION AVE
SUDBURY, MA

PROPOSED INSTALLATION PLAN

DWG SIZE	DESIGNER	ENGINEER	DATE:	ASSET I.D.	W.O. NO.:
22"X34"	S. MARTIN	T. MARRI	08/06/2022	DISTRIBUTION	1469826

DRAWING NO.	SHEET NO.
DPL-SUD-067813-1231	C-001

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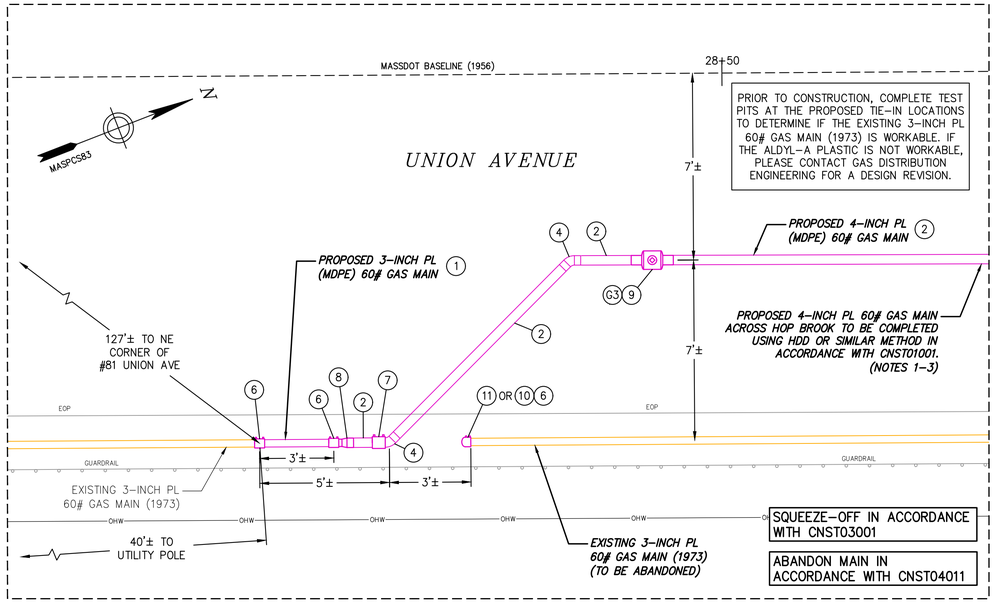
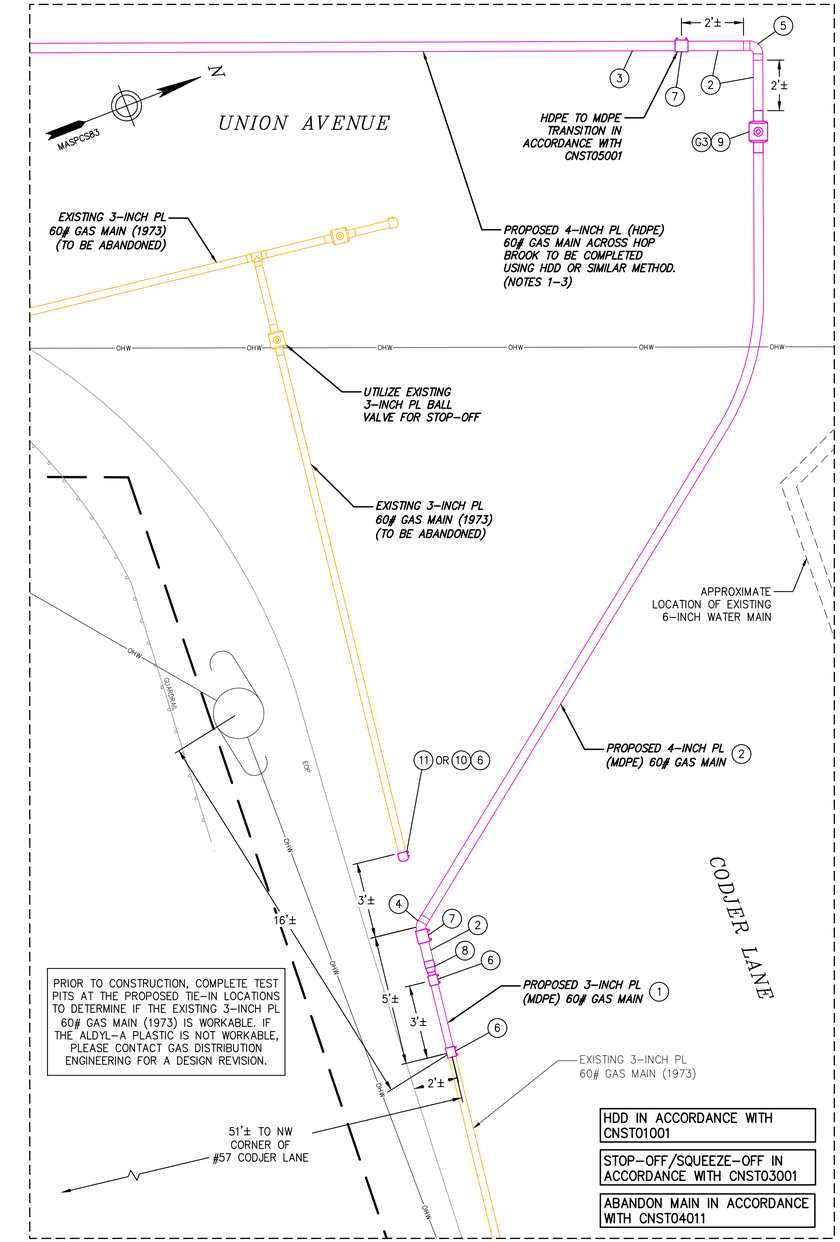
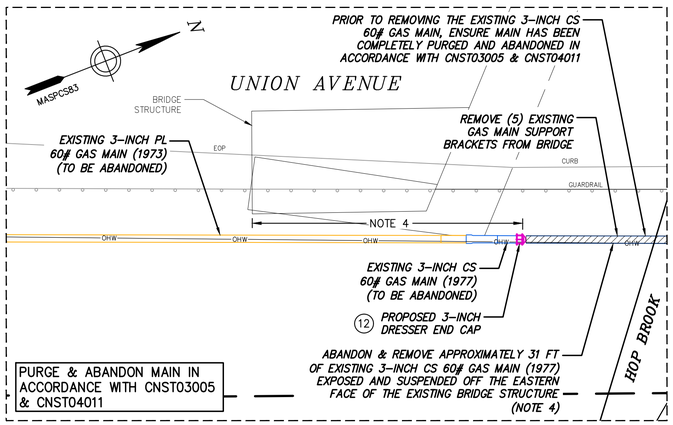


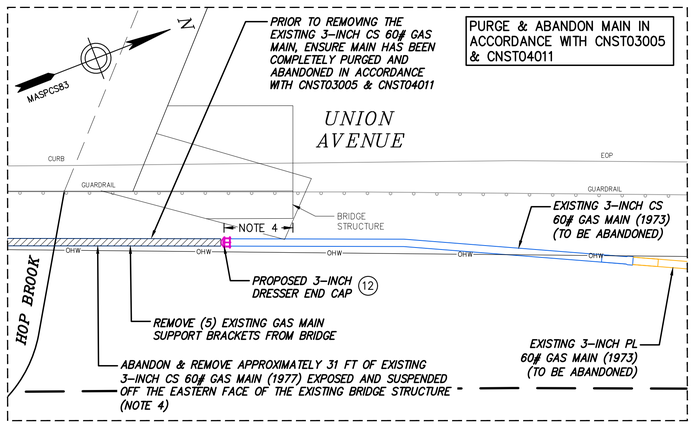
A PROPOSED TIE-IN AT #81 UNION AVENUE
SCALE: 1"=3'



B PROPOSED TIE-IN AT #57 CODJER LANE
SCALE: 1"=3'



C PROPOSED CUT & CAP AT SOUTHEAST SIDE OF UNION AVE BRIDGE
SCALE: 1"=3'



D PROPOSED CUT & CAP AT NORTHEAST SIDE OF UNION AVE BRIDGE
SCALE: 1"=3'

NOTES:
1) HDD CROSSING TO BE AT LEAST 5 FT BELOW FOOTINGS OF BRIDGE STRUCTURE, OR AT A SATISFACTORY DEPTH TO AVOID ANY NEGATIVE IMPACTS TO THE EXISTING BRIDGE STRUCTURE, WHICHEVER IS GREATER, AND DEPTHS SHALL BE VERIFIED AND APPROVED BY THE CONSULTANT PRIOR TO CONSTRUCTION.
2) EXACT LOCATION OF ENTRY/EXIT POINTS TO BE DETERMINED BY DRILLER DURING CONSTRUCTION.
3) CONTACT GAS DISTRIBUTION ENGINEERING FOR ADDITIONAL DESIGN DETAILS IF THE PROPOSED LIMITS OF HDD SIGNIFICANTLY EXCEED THE ROW LIMITS AT THE INTERSECTION OF UNION AVE AND CODJER LANE.
4) CUT & CAP THE EXISTING 3-INCH CS 60# (1973/1977) GAS MAIN TO THE NORTH AND SOUTH OF THE BRIDGE STRUCTURE. ENSURE THAT THE CUT & CAP LOCATIONS ARE FAR ENOUGH NORTH AND SOUTH OF THE BRIDGE STRUCTURE TO REMOVE THE EXISTING RISER SECTIONS WHERE THE EXISTING MAIN ENTERS THE EARTH AFTER BEING SUSPENDED OFF THE EASTERN BRIDGE FACE. FIELD VERIFY EXISTING 3" CS RISERS AND TRANSITION FITTINGS ON EASTERN SIDE OF BRIDGE PRIOR TO CONSTRUCTION.

GRAPHIC SCALE (FEET)
3' 1.5" 0 3'
SCALE: 1" = 3'
(WHEN PLOTTED AT 34"x22")

COMMONWEALTH OF MASSACHUSETTS
GARY W. PALERMO
CIVIL
No. 52392
REGISTERED PROFESSIONAL ENGINEER
6/29/2023

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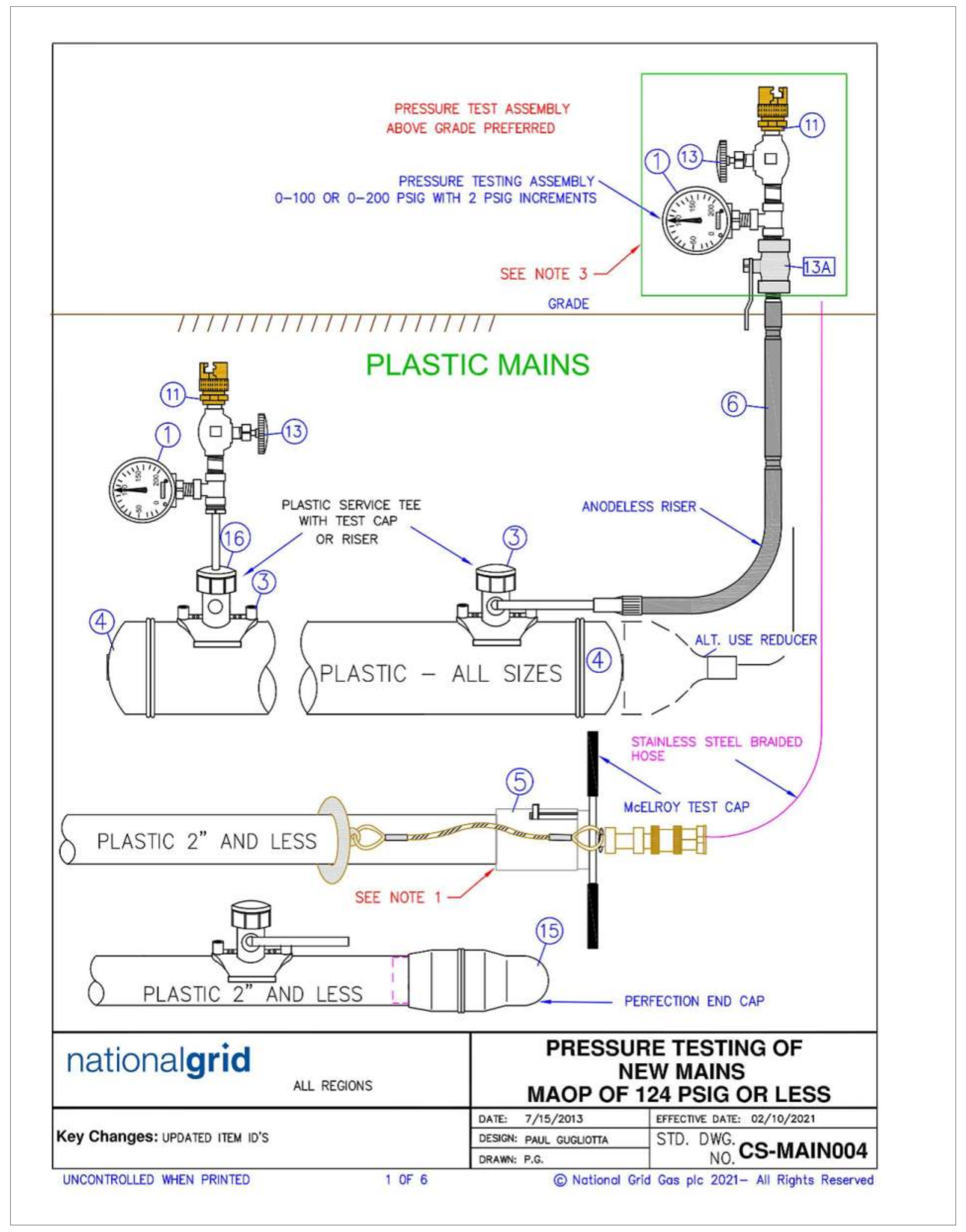
FINAL

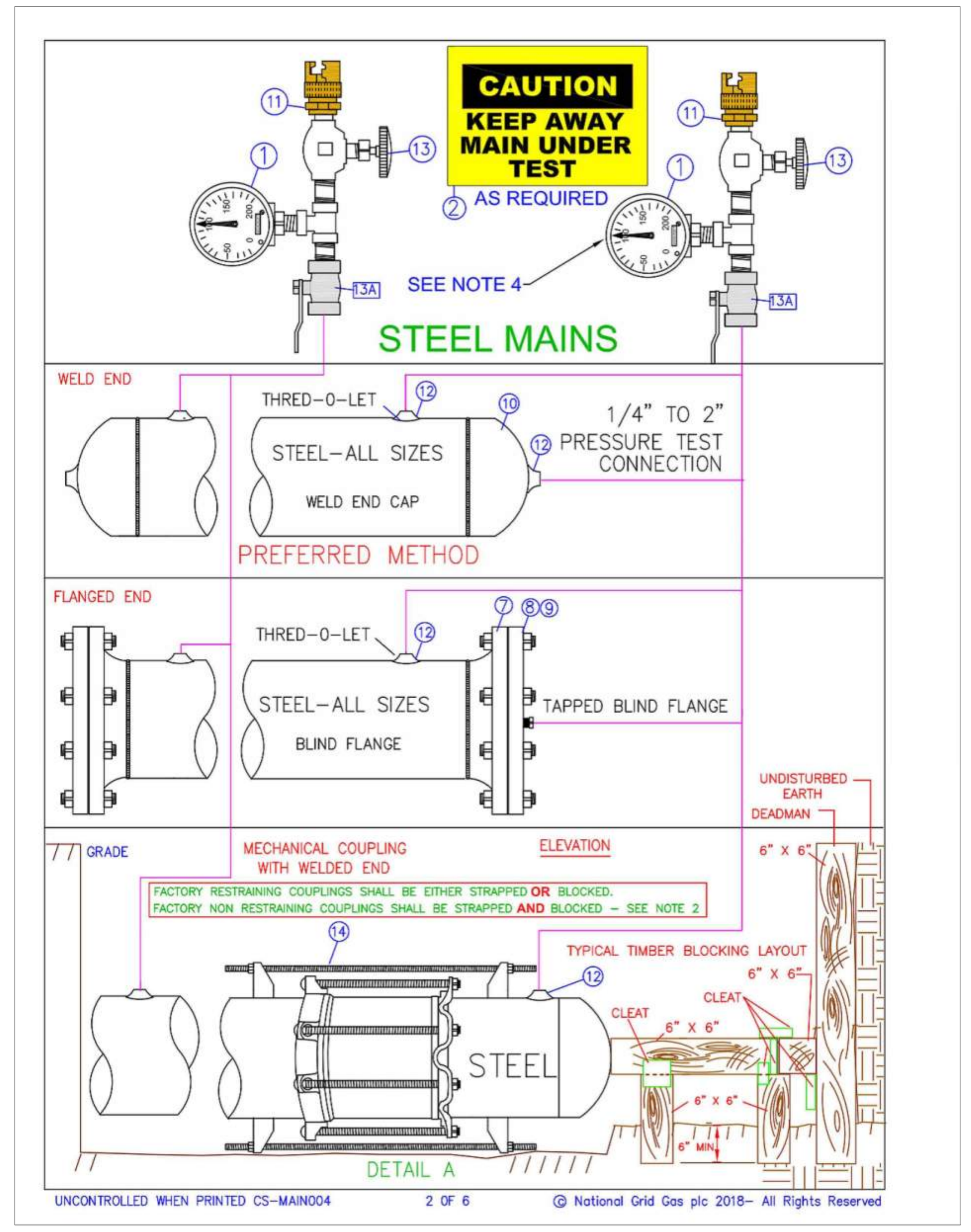
PROPOSED GAS MAIN REPLACEMENT
81 UNION AVE
SUDBURY, MA

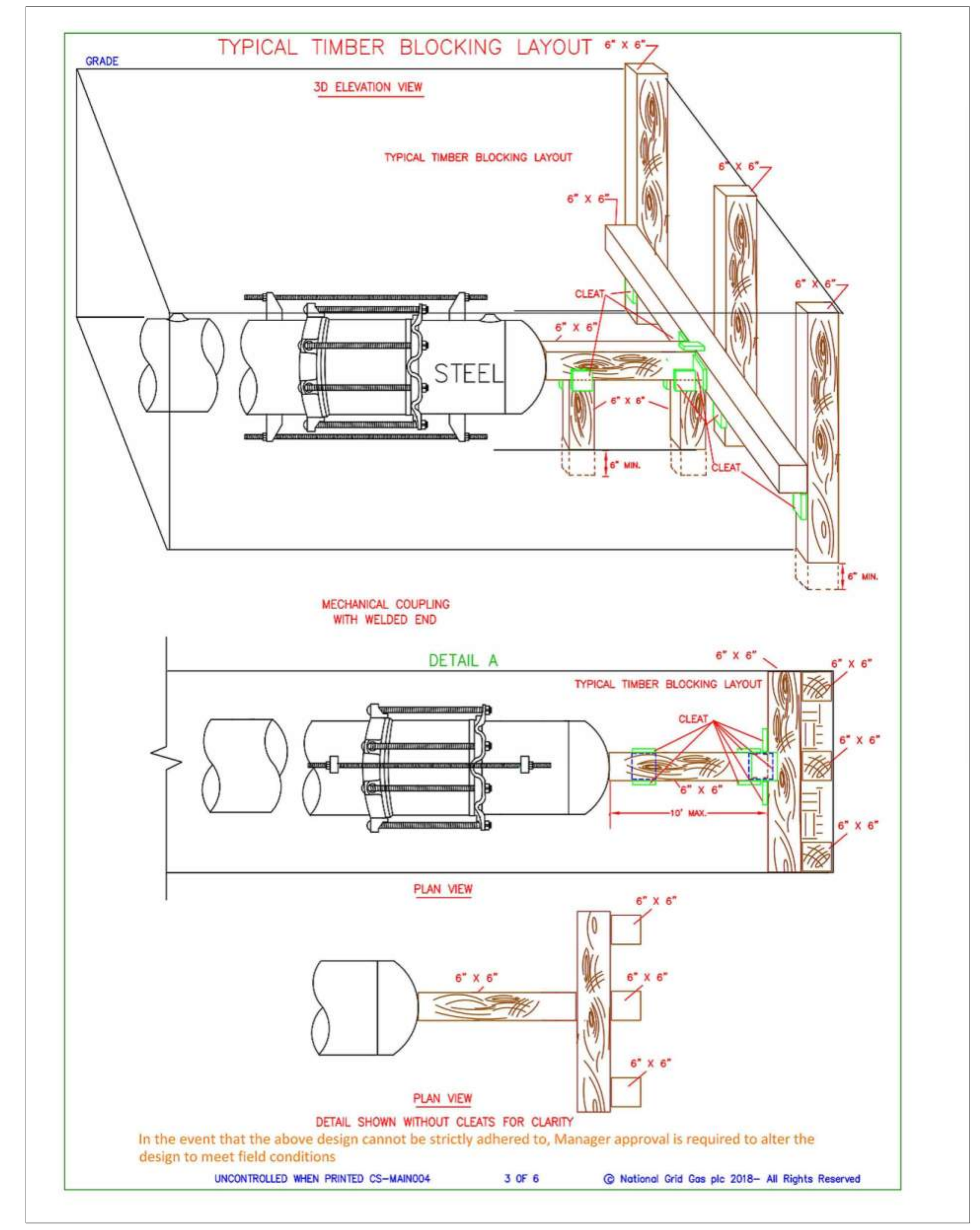
PROPOSED TIE-IN DETAILS

DWG SIZE	DESIGNER	ENGINEER	DATE:	ASSET I.D.	W.O. NO.:
22"X34"	S. MARTIN	T. MARRI	08/06/2022	DISTRIBUTION	1469826

DRAWING NO.	SHEET NO.
DPL-SUD-067813-1231	C-201







NOTES:

1. INSTALL PER MCELROY MANUFACTURER'S INSTRUCTIONS.
2. WHEN USING MECHANICAL COUPLINGS (AS SHOWN IN DETAIL A), NON-RESTRAINING COUPLING SHALL BE STRAPPED AND THE ENDS SHALL BE BLOCKED PER APPROVED STANDARD DRAWINGS. RESTRAINING COUPLINGS NEED TO BE EITHER STRAPPED OR BLOCKED. **WHEN USING RESTRAINING COUPLINGS, STRAPPING NUTS SHOULD BE HAND TIGHT.**

2A. ON EXISTING STEEL SYSTEMS: REFER TO THE TABLE BELOW FOR THE MINIMUM SAFE DISTANCE FROM THE EXCAVATION WALL. IF A BURIED, UNSTRAPPED COUPLING EXISTS AT A DISTANCE LESS THAN THE MINIMUM SAFE EMBEDMENT DISTANCE FROM THE WALL, THEN BLOCKING IS REQUIRED FOR THE PRESSURE TEST. IF AN ALL WELDED SYSTEM CAN NOT BE CONFIRMED, THE WELDED OR FLANGED ENDS SHALL BE BLOCKED

PIPE SIZE	MINIMUM SAFE DISTANCE FROM THE EXCAVATION WALL
(INCHES)	(FEET)
2	5
3	8
4	12
6	24
8	41
12	70

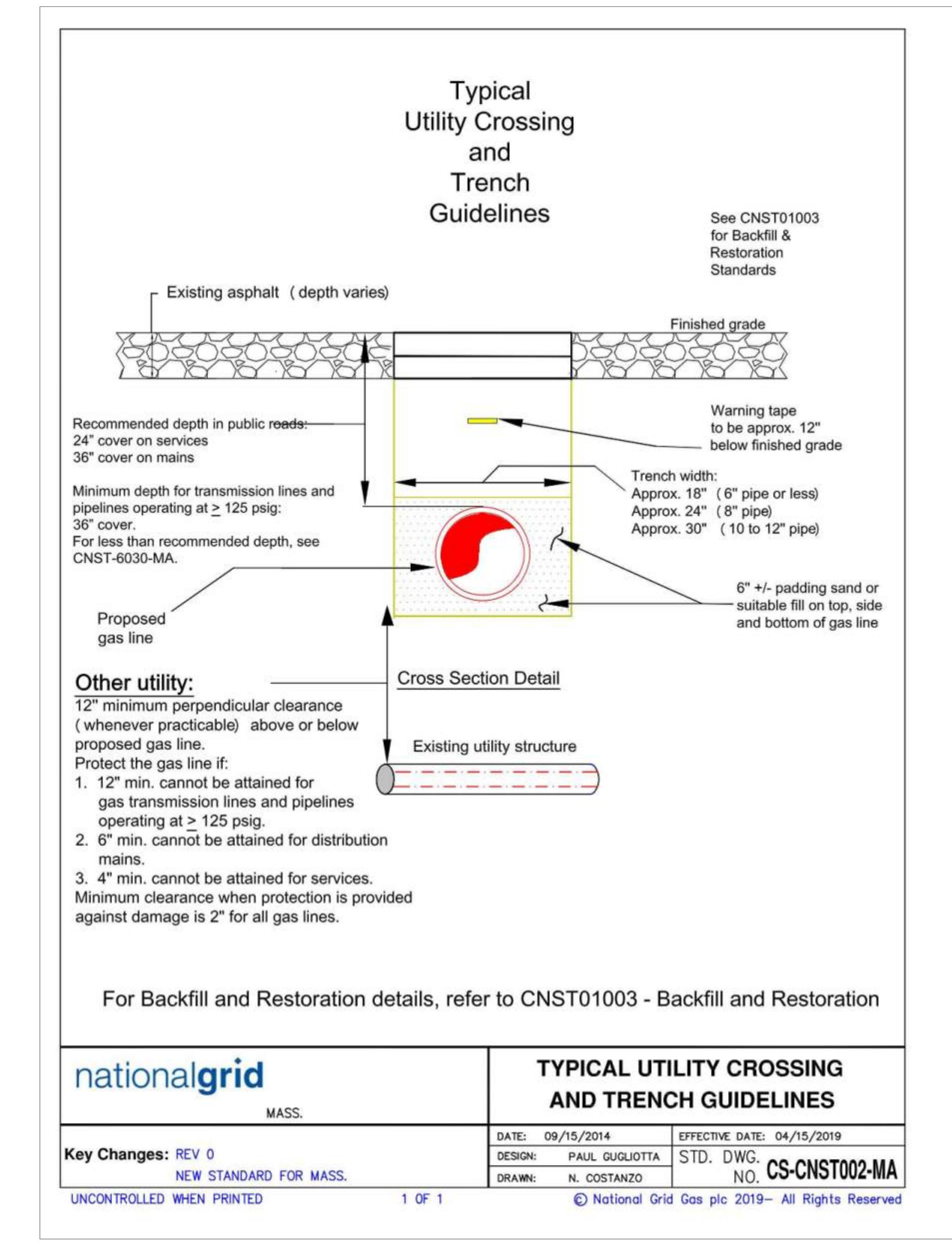
REFER TO CONSTRUCTION STANDARD FITS-6025 AND FITS-6015 FOR LIST OF COUPLINGS.

3. IT IS RECOMMENDED THAT THE GAUGE ASSEMBLY BE ABOVE GRADE TO PREVENT PERSONNEL FROM ENTERING THE TRENCH WHILE THE PRESSURE TEST IS UNDERWAY.
4. ONE PRESSURE TEST GAUGE AT EACH PIPE END IS RECOMMENDED TO VERIFY THE PRESSURE. ALL GAUGES SHALL BE 0-100 OR 0-200 PSIG RANGE (2 PSIG INCREMENTS REQ'D IN NY STATE ONLY).
5. REFER TO CNST04003 "***PRESSURE TESTING OF MAINS OPERATING BELOW 125 PSIG***" FOR TESTING AND DESIGN REQUIREMENTS.

ITEM	DESCRIPTION	SAP ITEM ID LI / MA / NYC	SAP ITEMS RI AND UNY
1	**PRESSURE GAUGE 0-100 OR 0-200 PSIG – 2 PSI INCREMENTS**		
	0-200 PSIG STAINLESS STEEL ¼" NPT 3-1/2" DIAL	9354865	TOOL ITEM
	0-200 PSIG STAINLESS STEEL ¼" NPT 2-1/2" DIAL	9358390	TOOL ITEM
	0-100 PSIG STAINLESS STEEL ¼" NPT	NON STOCK	TOOL ITEM
2	**SIGN – WARNING PRESSURE TEST (AS REQUIRED IN FIELD)**	9332240	NON STOCK
3	**TEE SERVICE – ELECTROFUSION YELLOW MD 1/2" CTS BUTT FUSE OUTLET**		
	2" MAIN X ½" BUTT FUSE OUTLET LI/MA/NY/NYC	9342517 2X1/2	NON STOCK
	4" MAIN X ½" BUTT FUSE OUTLET LI/MA/NY/NYC	9342518 4X1/2	NON STOCK
	6" MAIN X ½" BUTT FUSE OUTLET LI/MA/NY/NYC	9342516 6X1/2	NON STOCK
	8" MAIN X ½" BUTT FUSE OUTLET LI/MA/NY/NYC	9342371 8X1/2	NON STOCK
	TEE SERVICE – ELECTROFUSION YELLOW MD 1" CTS BUTT FUSE OUTLET	-	
	1-1/4" MAIN X 1" OUTLET LI	9342332 1-1/4 X 1	NON STOCK
	2" MAIN X 1" OUTLET LI	9342519 2X1	NON STOCK
	4" MAIN X 1" OUTLET LI	9342521 4X1	NON STOCK
	6" MAIN X 1" OUTLET LI	9342328 6X1	NON STOCK
	8" MAIN X 1" OUTLET LI	9342372 8X1	NON STOCK
	TEE SERVICE – ELECTROFUSION BLACK HD 1" IPS BUTT FUSE OUTLET		
	2" MAIN X 1" IPS OUTLET MASS	9322653 2X1	NON STOCK
	3" MAIN X 1" IPS OUTLET MASS	9322628 3X1	NON STOCK
	4" MAIN X 1" IPS OUTLET MASS	9322620 4X1	NON STOCK
	6" MAIN X 1" IPS OUTLET MASS	9322626 6X1	NON STOCK
	8" MAIN X 1" IPS OUTLET MASS	9323497 8X1	NON STOCK
	12" MAIN X 1" IPS OUTLET LI, NYC, MA	9351831 12X1	NON STOCK
	TEE SERVICE – SADDLE FUSION HIGH DENSITY BLACK 1/2" CTS BUTT FUSE		
	2" MAIN X 1/2" OUTLET LI	9342405 2X1/2	NON STOCK
	4" MAIN X 1/2" OUTLET LI	9342406 4X1/2	NON STOCK
	6" MAIN X 1/2" OUTLET LI	9342407 6X1/2	NON STOCK
	8" MAIN X 1/2" OUTLET LI	9342408 8X1/2	NON STOCK
	TEE SERVICE – SADDLE FUSION HIGH DENSITY BLACK 1" CTS BUTT FUSE		
	2" MAIN X 1" OUTLET LI	9342409 2X1 SDR 9	9315907 2X1
	4" MAIN X 1" OUTLET LI	9342429 4X1 SDR 9	9315964 4X1
	6" MAIN X 1" OUTLET LI	9342430 6X1 SDR 9	9315963 6X1
	8" MAIN X 1" OUTLET LI	9342431 8X1 SDR 9	9315962 8X1
	12" MAIN X 1" OUTLET	NON STOCK	9314629 12X1
	TEE SERVICE MECHANICAL X PERFECTION OUTLET		
	2" MAIN X 1/2" OUTLET	NON STOCK	9308584 2X1/2
	4" MAIN X 1/2" OUTLET	NON STOCK	9308583 4X1/2
	6" MAIN X 1/2" OUTLET	NON STOCK	9308472 6X1/2
	8" MAIN X 1/2" OUTLET	NON STOCK	9308471 8X1/2
	2" MAIN X 1" OUTLET	9315492 2X1	9315492 2X1
	3" MAIN X 1" OUTLET	9382123 3X1	N/A
	4" MAIN X 1" OUTLET	9315490 4X1	9315490 4X1
	6" MAIN X 1" OUTLET	9308473 6X1	9308473 6X1
	8" MAIN X 1" OUTLET	9306178 8X1	9306178 8X1

ITEM	DESCRIPTION	ORACLE ITEM ID LI / MA/ NYC	PEOPLESOFT ITEM RI AND UNY
4	**CAP END PLASTIC MEDIUM DENSITY YELLOW BUTT FUSE**		
	2" SDR11	2" 9339540	NON STOCK
	3" SDR 11	3" 9339541	NON STOCK
	4" SDR 11	4" 9339534	NON STOCK
	6" SDR 11	6" 9339733	NON STOCK
	8" SDR 13.5	8" 9339559	NON STOCK
	12" SDR.11.5	12" 9339560	NON STOCK
	CAP END PLASTIC HIGH DENSITY BLACK BUTT FUSION		
	2" SDR 9	2" 9339538	NON STOCK
	4" SDR 9	4" 9339535	NON STOCK
	6" SDR 9	6" 9339536	NON STOCK
	8" SDR 9	8" 9339537	NON STOCK
		-	-
	2" SDR 11 MASS RI & UNY	2" 9312686	2" 9312686
	3" SDR 11 MASS RI & UNY	3" 9310276	3" 9310276
	4" SDR 11 MASS RI & UNY	4" 9312685	4" 9312685
	6" SDR 11 MASS RI & UNY	6" 9312684	6" 9312684
	8" SDR 11 MASS RI	8" 9310272	8" 9310272
	12" SDR 11 RI UNY	NON STOCK	12" 9308729
		-	-
	8" SDR 13.5 RI	NON STOCK	8" 9312683
	12" SDR 13.5 RI	NON STOCK	12" 9314605
5	**McELROY TEST CAPS** (165 PSIG MAX)	NON STOCK	NON STOCK
	1-1/4" MODEL TP	TP-308	TP-308
	2" MODEL TP-310	TP-310	TP-310
	RISER	-	-
6	1" CTS MEDIUM DENSITY X ¾" NPT OUTLET	9344366	NON STOCK
	1" CTS MEDIUM DENSITY X 1-1/4" IPS OUTLET	9340874	NON STOCK
	1" HIGH DENSITY X 1-1/4" OUTLET	9340853	NON STOCK
	1" CST SERVASET X 1" OUTLET	9322627	NON STOCK
	1" CTS HIGH DENSITY .090" WALL X 1" IPS STEEL OUTLET	NON STOCK	9316405
	½" CTS .090" WALL PERFECTION END X ¾" NPT STEEL	NON STOCK	9310295
	1-1/4" CTS .090" WALL PERFECTION END X 1-1/4" NPT STEEL	NON STOCK	9306180
	OR TEST CAPS WITH STEEL OR PLASTIC PIPE TO TEST TREE TEST CAP FOR CENTRAL PLASTIC ELECTROFUSE TAPPING TEE	00311110 OR TOOL ROOM ITEM	TOOL ROOM ITEM
7	**FLANGE 150# WELD END FLAT FACE**		
	2"	9314322 2"	9314322
	3"	9314431 3"	9314431
	4"	9314430 4"	9314430
	6"	9308659 6"	9308659
	8"	9308748 8"	9308748
	12"	9308660 12"	9308660
	16"	9322363 MA 16"	NON STOCK
	20"	9322362 MA 20"	NON STOCK
8	**BLIND FLANGE CLASS 150# ASTM A-105**		
	2" FLAT FACE WITH ¾" CENTER NPT TAP	9341434 2"	NON STOCK
	3" FLAT FACE WITH ¾" CENTER NPT TAP	9341014 3"	NON STOCK
	4" FLAT FACE WITH ¾" CENTER NPT TAP	9341435 4"	NON STOCK
	6" FLAT FACE WITH ¾" CENTER NPT TAP	9340942 6"	NON STOCK
	2" FLAT FACE	9382074 2"	9308662
	3" FLAT FACE	9307751 3"	9307751
	4" FLAT FACE	9306252 4"	9306252
	6" FLAT FACE	9385747 6"	9306518
	8" FLAT FACE	9307750 8"	9307750
	12" FLAT FACE	9308749 12"	9308749
9	**GASKETS**	-	-
	2" FULL FACE 150#	9333167 2"	9315688
	3" FULL FACE 150#	9341158 3"	9312067
	4" FULL FACE 150#	9341159 4"	9312569
	6" FULL FACE 150#	9332599 6"	9312568
	8" FULL FACE 150#	9341168 8"	9315689
	12" RING TYPE 150#	9341165 12"	NON STOCK

ITEM	DESCRIPTION	ORACLE ITEM ID LI / MA / NYC	PEOPLESOFT ITEM RI AND UNY
10	**END CAPS – STEEL WELD END STANDARD WALL –GRADE B**		
	2"	9312095 2"	9312095
	3"	9308719 3"	9308719
	4"	9312096 4"	9312096
	6"	9312094 6"	9312094
	8"	9312093 8"	9312093
	10"	9315182 10"	9315182
	12"	9312092 12"	9312092
	16"	9314824 16"	9314824
	20"	9339687 20"	9314823
11	**THOR FITTING**	-	-
	½" MALE NPT X HOSE CONNECTION	00504089	NON STOCK
	¾" FEMLAE X HOSE CONNECTION	00504301	NON STOCK
12	**THRED-O-LET**	-	-
	12" - 6" X ¾" 3000# PER ASTM A-105 GRADE B	9341652 12-6X3/4	NON STOCK
	10" – 6" X 1" 3000# PER ASTM A-105 GRADE B	9341656 10-6X1	NON STOCK
	36" – 12" X 1" 3000# PER ASTM A-105 GRADE B	9342052 36-12X1	NON STOCK
	2" X 1" 3000# PER ASTM A-105 GRADE B	NON STOCK	9307678 2X1
	10" – 6" X 1" 3000# PER ASTM A-105 GRADE B	NON STOCK	9307695 10-6X1
	36"-14" X ¾" 3000# PER ASTM A-105 GRADE B	NON STOCK	9307677 36-14X3/4
13	**VALVE**		
13A	**VALVE (OPTIONAL – TO SHUT OFF TEST ASSEMBLY)**		
14	**LUG ASSEMBLY**		
	7/8" x 24" LONG (LI ONLY - SEE MAIN-6210)	9342211	NON STOCK
	7/8"X 44"LONG (LI ONLY - SEE MAIN-6210)	9342212	NON STOCK
	LUG GREEN 3"- 8"MAIN 7/8" DIAM. (NYC ONLY – SEE MAIN-6230 & MAIN-6230)	9357904	NON STOCK
	LUG YELLOW 10"- 30" MAIN 1-1/16" DIAM. (NYC ONLY – SEE MAIN-6230& MAIN-6230)	9357905	NON STOCK
	ROD ¾" X 12' LONG (NYC ONLY	9328152	NON STOCK
	ROD 1" X 12" LONG (NYC ONLY)	9328150	NON STOCK
	LUG ASSEMBLY ¾"X 30" LONG	NON STOCK	9315741
15	**COUPLING – END 2" PERFECTION**	NON STOCK	0803641
16	**TEST CAP**	-	TOOL ROOM ITEM
	FOR SADDLE FUSION TEE – CENTRAL PLASTICS	9325109	
	FOR SADDLE FUSION TEE– JM EAGLE / POLY / UPONOR	9325017	
	FOR SADDLE FUSION TEE – PERFORMANCE PIPE TEES	9341368	
	FOR HVTT (HIGH VOLUME TAPPING TEE) SADDLE FUSION CENTAL PLASTICS	9384268	
	FOR HVTT (HIGH VOLUME TAPPING TEE) SADDLE FUSION– JM EAGLE / POLY/ UPONOR	9384174	
	FOR HVTT (HIGH VOLUME TAPPING TEE) SADDLE FUSION PERFORMANCE PIPE TEES	9323715	
	FOR HVTT ELECTROFUSION TEE	9382494	
	FOR ELECTROFUSION TEE	9381846	
	FOR PERFECTION PMTT MECHANICAL TEE (CAP FITS ALL MAIN SIZE & OUTLET SIZES OF PMTTS)	9339561	



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COMMONWEALTH OF MASSACHUSETTS GARY W. PAKERIAN CIVIL No.52392 REGISTERED PROFESSIONAL ENGINEER

4/12/2023

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Norwell, MA 02061-1620
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NO.	DESCRIPTION	DATE	DR.BY	CK.BY	APP.BY

BOSTON GAS COMPANY
d/b/a
nationalgrid
170 DATA DRIVE
WALTHAM, MA 02451

FINAL

PROPOSED GAS MAIN REPLACEMENT
81 UNION AVE
SUDBURY, MA

NATIONAL GRID STANDARD CONSTRUCTION DETAILS

DWG SIZE	DESIGNER	ENGINEER	DATE:	ASSET I.D.	W.O. NO.:
22"X34"	S. MARTIN	T. MARRI	08/06/2022	DISTRIBUTION	1469826

PAGE 5 OF 8

DRAWING NO.	SHEET NO.
DPL-SUD-067813-1231	C-301

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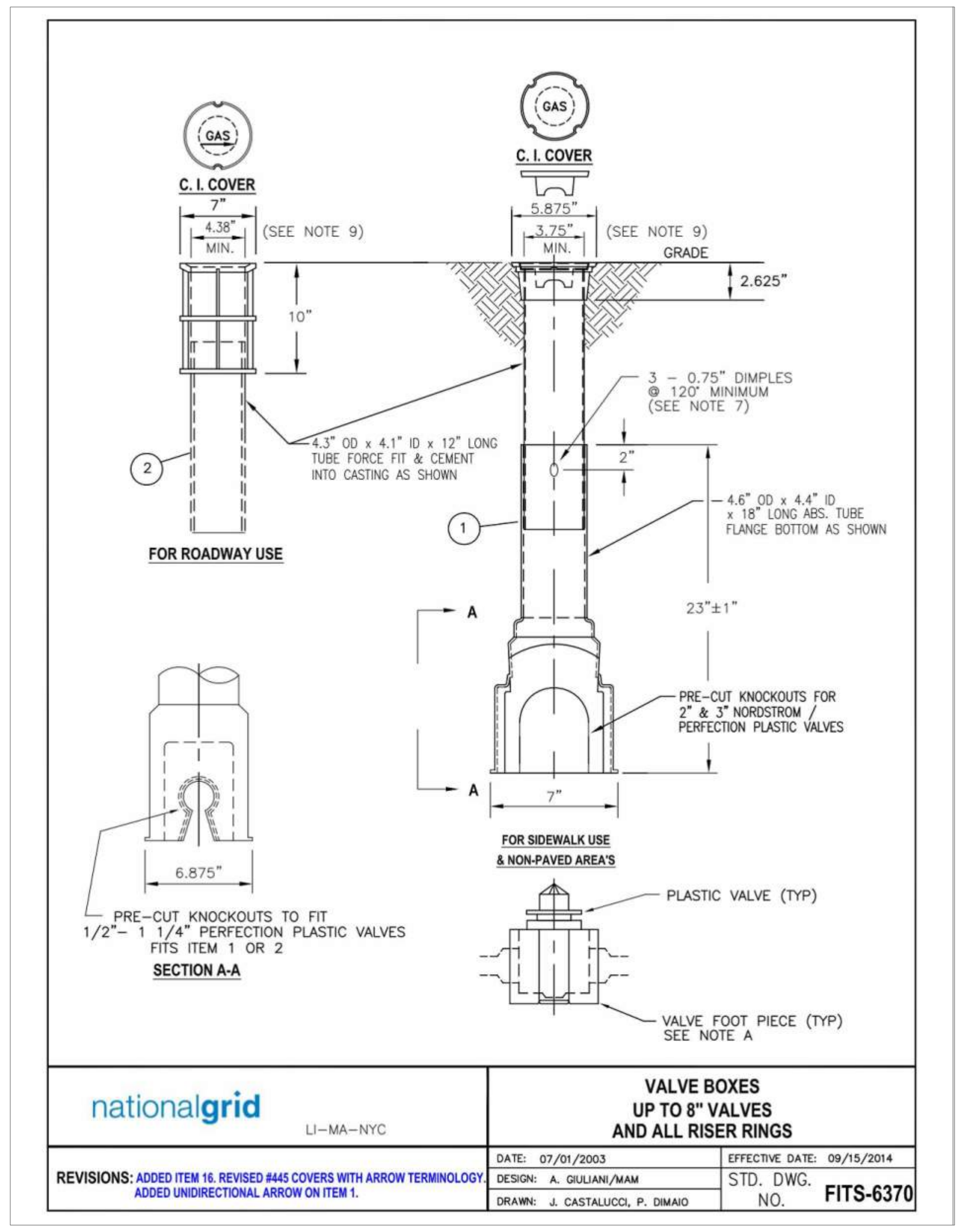

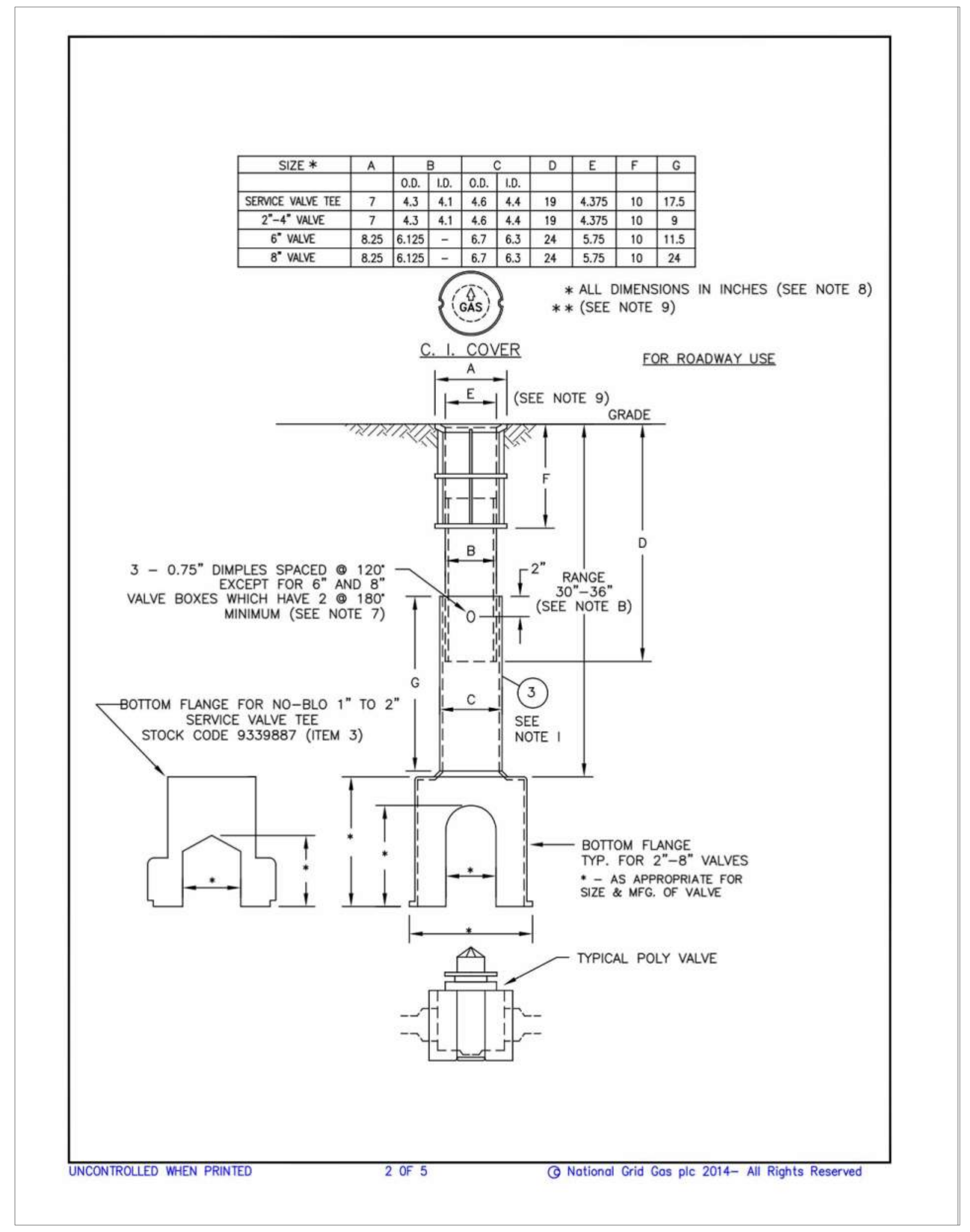

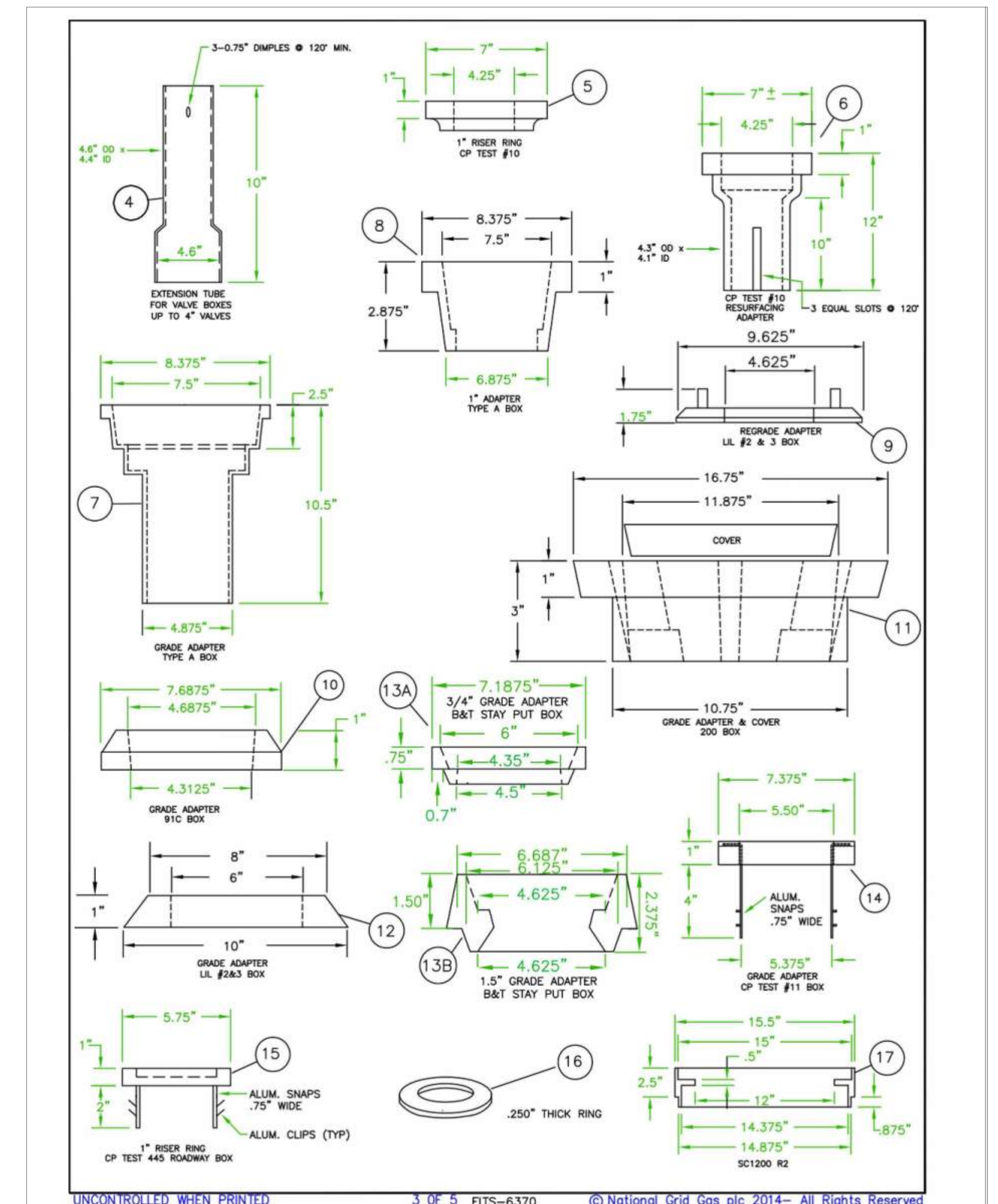

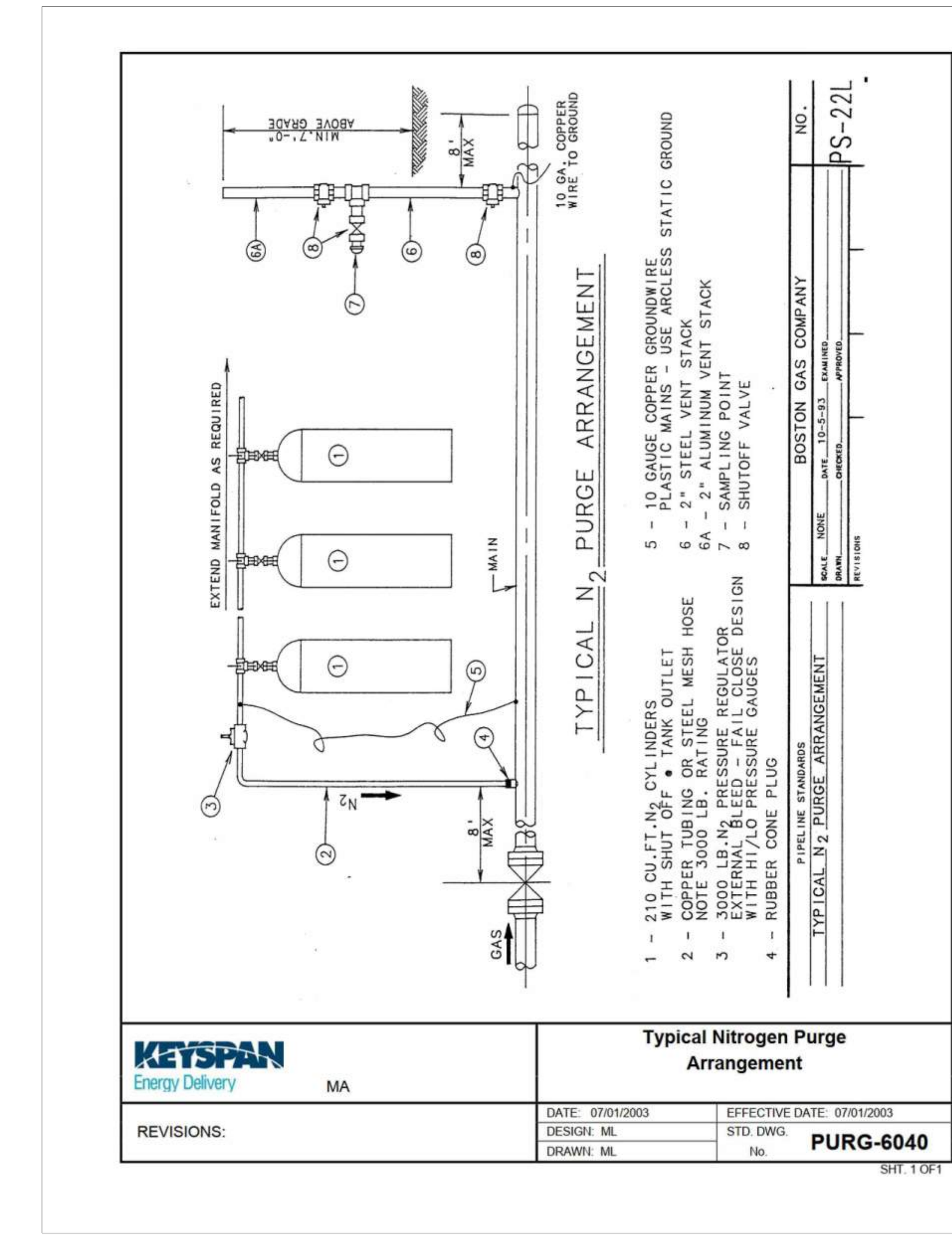

INSTALLATION NOTES:

A. VALVE FOOT PIECE TO BE INSTALLED AROUND THE VALVE THEN INSERTED INTO THE BOTTOM FLANGE OF THE VALVE BOX.

B. THE RANGE OF THE VALVE BOX. FROM TOP OF GRADE TO TOP OF VALVE, IS 24" TO 38". FOR DEEPER VALVES USE EXTENSION TUBE STOCK CODE 00308023.

C. THESE BOXES CAN ALSO BE USED WITH THE APPROPRIATE SIZE STEEL VALVE. IF USED WITH A STEEL VALVE THE "VALVE FOOT PIECE" IS NOT TO BE USED; HOWEVER, PRIOR TO BACKFILLING INSTALL THE LOWER PORTION OF THE VALVE KEY ON THE VALVE OPERATING NUT. THEN PLACE THE LOWER SECTION OF THE BOX ON THE VALVE. WHEN THE BOTTOM SECTION IS BACKFILLED TO WITHIN 6" FROM ITS TOP REMOVE THE VALVE KEY & INSTALL THE TOP SECTION OF THE BOX.

D. ITEM 2 SHALL ONLY BE USED IN SIDEWALK AND NON-PAVED, NON TRAFFIC AREA EXCEPT DRIVEWAYS.

E. USE ITEM 1 ON MAIN LINE VALVES INSTALLED IN PAVED AND NON PAVED AREAS.

F. AFTER INSTALLATION OF MAIN LINE VALVE & BOX NOTIFY GSO OF COMPLETION.

MANUFACTURING NOTES:

1. ALL TOPS & BOTTOMS SHALL BE INTERCHANGEABLE.
2. THE TOP OF THE BOX ASSEMBLY SHALL BE FABRICATED SO AS TO FIT INSIDE THE BOTTOM SECTION.
3. MATERIAL SHALL CONFORM TO ASTM SPECIFICATIONS FOR GREY CAST IRON CASTINGS, DESIGNATED A48, CLASS 25.
4. COVER SHALL CREATE A TIGHT FIT WITH TOP OF CASTING TO PREVENT RATTLING. FOR CODES 00308054 & 00308055 COVER SHALL BE OF VENTED DESIGN. FOR OTHER STOCK CODES THE COVER SHALL INCLUDE A DIRECTIONAL ARROW. THIS SHALL BE DESIGNED TO ALLOW THE ARROW TO BE POSITIONED AT 60 INTERVALS.
5. ALL SURFACES SHALL BE COVERED WITH ONE COAT OF FLINTKOTE HYDALT PROTECTIVE COATING, C-13-E OR APPROVED EQUAL.
6. THE PLASTIC USED FOR THE TUBES SHALL BE PROTECTED FROM UV RAYS & AND HAVE THE PROPER INHIBITORS TO PROTECT FROM BRITTLENESS AT ZERO DEGREES.
7. DIMPLES SHALL BE FORMED SO AS TO EXERT ENOUGH PRESSURE ON INNER TUBE TO SUPPORT ENTIRE ASSEMBLY IN EXTENDED POSITION.
8. DIMENSIONAL TOLERANCES: MANUFACTURE SHALL ADHERE TO THE FOLLOWING DIMENSIONAL TOLERANCES ALL PLASTIC TUBING SHALL BE +/- 0.015" TO THOSE SHOWN ON THE DRAWING. ALL CASTINGS SHALL BE MANUFACTURED TO WITHIN +/- 0.0625" TO THE DIMENSIONS SHOWN ON THE DRAWING.
9. DIMENSIONS SHALL BE CONSISTENT THROUGHOUT THE CASTING.
10. TOP SECTION OF VALVE BOX SHALL HAVE THE PLASTIC TUBE FORCED FIT AND CEMENTED INTO THE CASTING. THIS JOINT SHALL BE CAPABLE OF WITHSTANDING A PULL OUT FORCE OF 20 POUNDS.
11. MANUFACTURER SHALL SUBMIT SAMPLES TO THE ENGINEER FOR APPROVAL PRIOR TO BID ACCEPTANCE.
12. STREET BOXES SHALL BE DESIGNED TO HANDLE TO AN H-20 ROADWAY LOADING.
13. TOP FLANGE OF ROADWAY BOX SHALL BE FLAT AND WIDE ENOUGH TO ACCOMMODATE A 3/8" METAL NUMBER STAMP EMBEDDED INTO THE CASTING BY CKD IN THE FIELD.
14. THE VALVE FOOT PIECE SHALL BE DESIGNED TO FIT THE FOLLOWING MANUFACTURER'S VALVES.
    ½"- 1 ¼" - PERFECTION
    2" - NORDSTROM OR PERFECTION UNIVERSAL FOOT PC FOR BOTH MFG.
    4" - 8" NORDSTROM

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Effective Date 09/15/2014
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FITS-6370

No.	ITEM	N.G. CODE No.
18	PENTAGON KEY FOR ITEMS 8B AND 11B (NOT SHOWN)	9354644
17	2" REGRADE ADAPTER FOR 12" LOCKING BOX SC1200 R2	9384175
16	VALVE BOX ADAPTER RING, 1/4 INCH THICK X 7-5/8 INCH I.D. X 10-1/2 IN O.D. FLAT RING TO RAISE OLD LEGACY OBSOLETE LILCO ROUND CASTINGS	9353359
15	ONE INCH GRADE ADAPTER & COVER FOR CP TEST#445 ROADWAY BOX - NH ONLY	9383913
*	REPLACEMENT COVER FOR LIL #2 BOX - LI ONLY COVER MARKED "GAS" FOR 445 BOX (WITH UNIDIRECTIONAL ARROW) COVER MARKED "GAS" FOR 445 BOX (WITHOUT UNIDIRECTIONAL ARROW) COVER MARKED "GAS" FOR 4" STAY PUT BOX - NYC ONLY COVER MARKED "GAS" FOR #11B BOX COVER MARKED "GAS" FOR #10 BOX RESURFACE REPAIR SLEEVE RING	9339829 9339828 9388350 9339759 9339858 9339762
14	1" REGRADE ADAPTER WITH COVER FOR CP TEST # 11B BOX - SEE NOTE B	9382611
13A 13B	¾" REGRADE ADAPTER FOR B&T STAY PUT SERVICE BOX WITH SLOTS NYC ONLY 1-½" REGRADE ADAPTER FOR B&T STAY PUT SERVICE BOX WITH SLOTS NYC ONLY	9339800 9339725
12 *	1" REGRADE ADAPTER FRAME FOR THE LIL# 2 & 3 VALVE BOX. COVER FOR ABOVE (NOT SHOWN) - LI ONLY	9339859 9339860
11B	COVER, REPLACEMENT, LOCKING, MARKED "GAS" FOR EXISTING LOCK TYPE 200 BOX, WITH PENTHEAD BOLT - LI ONLY (NOT SHOWN)	9384338
11A	COVER, REPLACEMENT, NON-LOCK, MARKED "GAS" FOR EXISTING NON-LOCK TYPE 200 BOX - LI ONLY (NOT SHOWN)	9339798
11	1" REGRADE ADAPTER FRAME & COVER FOR 200 VALVE BOX - LI ONLY	9339826
*	2-1/2" REGRADE ADAPTER FOR 200 VALVE BOX. FITS EXISTING COVER. (NOT SHOWN) - LI ONLY	9339799
10	1 " REGRADE ADAPTER & COVER FOR 91C BOX - LI ONLY	9339761
9	1 ¾" REGRADE ADAPTER FOR LIL 2&3 BOX - LI ONLY	9339758
8B	COVER, REPLACEMENT, LOCKING, MARKED "GAS" FOR 7-1/2" EXISTING TYPE "A" LOCK VALVE BOXES, WITH PENTHEAD BOLT - LI ONLY (NOT SHOWN)	9339760
8A	COVER, REPLACEMENT, MARKED "GAS" FOR 7-1/2" EXISTING TYPE "A" NON-LOCK VALVE BOXES AND ALL TYPE "A" ADAPTER RINGS - LI ONLY (NOT SHOWN)	9384430
8	1 " REGRADE ADAPTER FOR TYPE "A" VALVE BOX. FITS EXISTING COVER. - LI ONLY	9339827
7	2 -½" REGRADE ADAPTER FOR TYPE "A" VALVE BOX . 2-1/2 IN MIN TO 8 IN MAX RISE. FITS EXISTING COVER. - LI ONLY	9339763
6	1" REGRADE ADAPTER RING EXTENSION WITH 10" PLASTIC SKIRT TO REPAIR TOPS OF CP TEST #10 BOX	9381407
5	1" REGRADE ADAPTER FOR CP TEST #10 BOX	9339823
4	EXTENSION TUBE – FOR CP TEST #11 BOX EXTENSION TUBE - FOR CP TEST #10 BOX	9382619 9339824
*	EXTENSION TUBE, FOR CP TEST #558 BOX, 18" LONG – (NOT SHOWN) - NE ONLY EXTENSION TUBE, FOR CP TEST #334 BOX, 24" LONG – (NOT SHOWN) - NE ONLY	9383199 9383198
3	ROADWAY BOX ASSEMBLY AND COVER FOR 8" POLYVALVE CP TEST #11B OR APPV'D EQUAL ROADWAY BOX ASSEMBLY AND COVER FOR 6" POLYVALVE CP TEST 11B OR APPV'D EQUAL ROADWAY BOX ASSEMBLY AND COVER FOR 4" POLYVALVE CP TEST #10 OR APPV'D EQUAL ROADWAY BOX ASSEMBLY AND COVER FOR 2" AND 3" POLYVALVES CP TEST #10 OR APPR'D EQUAL ROADWAY BOX ASSEMBLY AND COVER FOR 1"- 2" MUELLER SERVICE VALVE TEE CP TEST #10 OR APPV'D EQUAL	9339893 9339892 9339891 9339890 9339887
2	ROADWAY SERVICE BOX AND COVER FOR ½" TO 1" PLASTIC VALVE NE ONLY CP TEST #10 OR APPV'D EQUAL	9382767
1	SIDEWALK VALVE BOX ASSEMBLY AND UNIDIRECTIONAL ARROW COVER FOR ½" TO 1 ¼" PLASTIC VALVES CP TEST #445 OR APPR'D EQUAL SIDEWALK VALVE BOX ASSEMBLY AND UNIDIRECTIONAL ARROW COVER FOR 2" TO 3" PLASTIC VALVES CP TEST #445 OR APPROVED EQUAL	9339888 9339889

BILL OF MATERIAL

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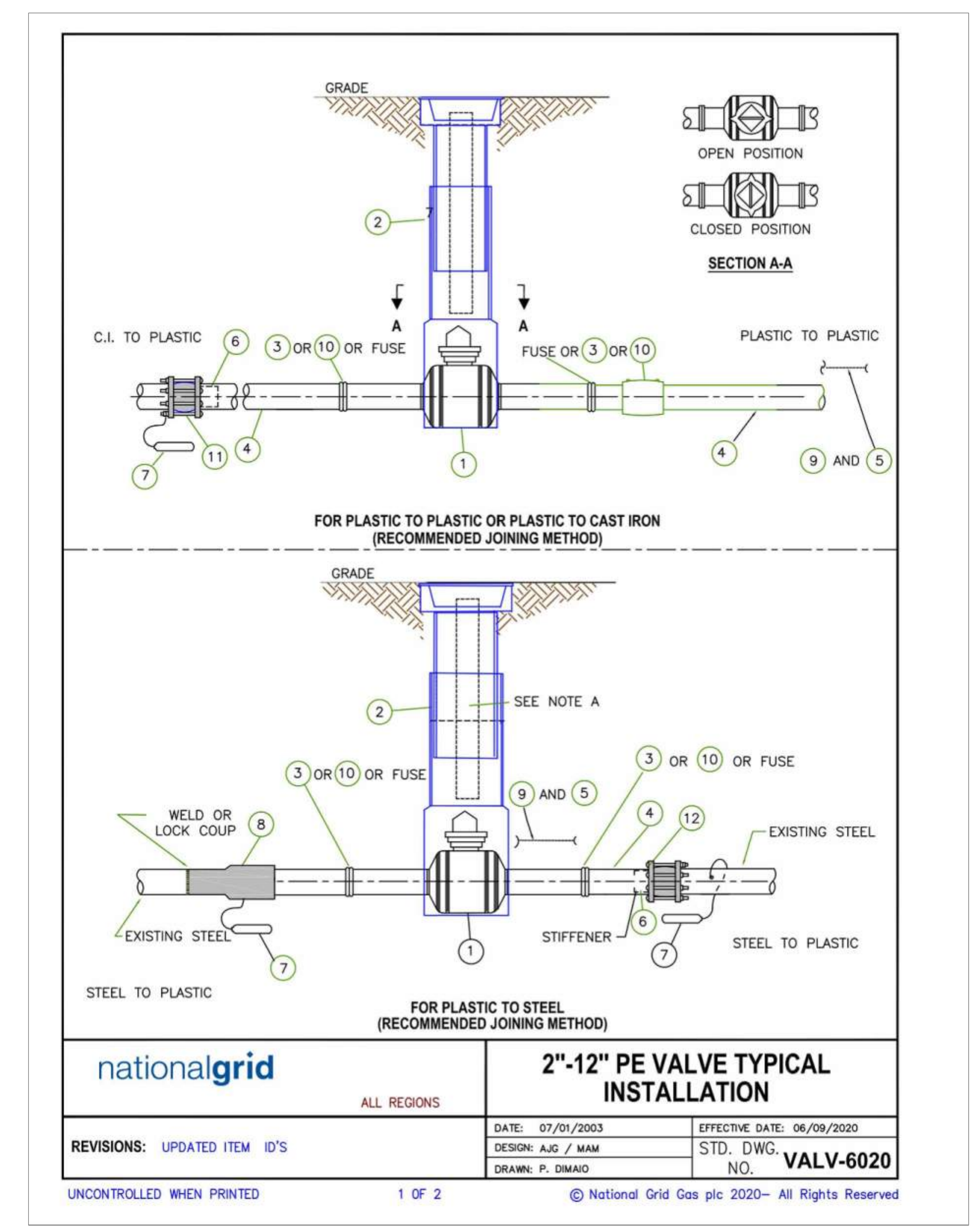
Effective Date 09/15/2014
5 OF 5

FITS-6370



NOTES:
A. IN DNY LI REGION, INSTALL A LENGTH OF 2" DIAMETER PE OR SMALLER TUBING IN THE VALVE BOX TO IDENTIFY THE VALVE AS PLASTIC.
B. INSTALL TRACER WIRE OR BALL MARKERS AS REQUIRED IN YOUR REGION FOR PE INSTALLATIONS.
C. NOT USED ON THE DNY LI 99 & 124 PSI PE SYSTEM.
D. REFER TO REGIONAL STANDARDS FOR MATERIAL IDS NOT GIVEN BELOW.

No.	ITEM	SAP ID	SAP ID	SAP ID
1	VALVE, PE (PORT CONFIGURATION AS NOTED)	**UNY AND RI** **LP TO 100 PSIG HD** 9311203 12" DR 11 FULL PORT W/ GEAR OPERATOR **RI ONLY** 9307909 12" DR 13.5 FULL PORT W/ GEAR OPER **UNY ONLY** 9311173 8" DR 11 FULL PORT **RI ONLY** 9315189 8" DR 13.5 FULL PORT **UNY ONLY** 9312116 6" DR 11 FULL PORT 9312058 4" DR 11 FULL PORT 9308561 3" DR 11 FULL PORT **RI ONLY** 9312060 2" DR 11 FULL PORT 9311146 2" DR 11 FULL PORT WITH PERMASERT ENDS	**LI ONLY** **99 AND 124 PSIG HD** 9341706 8" RED PORT DR 9 9341705 6" RED PORT DR 9 9341700 4" RED PORT DR 9 9341699 2" FULL PORT DR 9	**LI, NYC AND NE** **LP TO 60 PSIG MEDIUM DENSITY** 9341704 12" FULL PORT DR 13.5 9386594 8" FULL PORT DR 13.5 9323032 6" FULL PORT DR 11.5 9341709 4" FULL PORT DR 11.5 9323299 3" FULL PORT DR 11 9341784 2" FULL PORT DR 11 9341408 8" RED PORT DR 13.5 9341757 6" RED PORT DR 11.5 9341693 4" RED PORT DR 11.5 9341756 3" RED PORT DR 11 **100 PSIG HIGH DENSITY (NE ONLY)** 9323610 4" RED PORT DR 11 9323611 6" RED PORT DR 11 9323612 8" RED PORT DR 11 9312060 2" FULL PORT DR 11 9312058 4" FULL PORT DR 11 9312116 6" FULL PORT DR 11
2	ROADWAY VALVE BOX WITH COVER	**SAP ID** SELECT ROADWAY VALVE BOX BELOW TO MATCH SIZED VALVE GIVEN SEE DWG FITS 6360 (FOR 12" VALVE) 9311208 (FOR 2" THRU 8" VALVE)	**SAP ID** SELECT ROADWAY VALVE BOX BELOW TO MATCH SIZED VALVE GIVEN 9341706 8" RED PORT 9341705 6" RED PORT 9341700 4" RED PORT 9341699 2" FULL PORT	**SAP ID** SELECT ROADWAY VALVE BOX BELOW TO MATCH SIZED VALVE GIVEN 9382626 FOR 12" FULL PORT 9382626 FOR 8" FULL PORT 9339893 FOR 6" FULL PORT 9339892 FOR 4" FULL PORT 9339890 FOR 3" FULL PORT 9339890 FOR 2" FULL PORT 9339893 FOR 8" RED PORT 9339892 FOR 6" RED PORT 9339891 FOR 4" RED PORT 9339891 FOR 3" RED PORT
3	COUPLING ELECTROFUSE			
4	PLASTIC PIPE			
5	BURIAL TAPE			
6	INSERT STIFFENER (SEE NOTE C)			
7	ANODE, 17 LB			
8	TRANSITION FITTING STL TO PE			
9	TRACER WIRE OR (BALL MARKER IF USED IN REGION)			
10	COUPLING 2" PERFECTION PERMASERT (SEE NOTE C)			
11	COUPLING, PE TO CI, LOCKING INSULATING, MECHANICAL			
12	COUPLING, PE TO STL, LOCKING, NON-INSULATING MECHANICAL (SEE NOTE C)			

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Effective Date 06/09/2020
2 OF 2

VALV-6020

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COMMONWEALTH OF MASSACHUSETTS
GARY W. PANEBIANCO
CIVIL
No. 52392
REGISTERED PROFESSIONAL ENGINEER
4/12/2023

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Norwell, MA 02061-1620
781-982-7700 . www.chacompanies.com

NO.	DESCRIPTION	DATE	DR.BY	CK.BY	APP.BY

BOSTON GAS COMPANY
d/b/a
nationalgrid
170 DATA DRIVE
WALTHAM, MA 02451

FINAL

PROPOSED GAS MAIN REPLACEMENT
81 UNION AVE
SUDBURY, MA

NATIONAL GRID STANDARD CONSTRUCTION DETAILS

DWG SIZE	DESIGNER	ENGINEER	DATE:	ASSET I.D.	W.O. NO.:
22"X34"	S. MARTIN	T. MARRI	08/06/2022	DISTRIBUTION	1469826

PAGE 6 OF 8

DRAWING NO.	SHEET NO.
DPL-SUD-067813-1231	C-302

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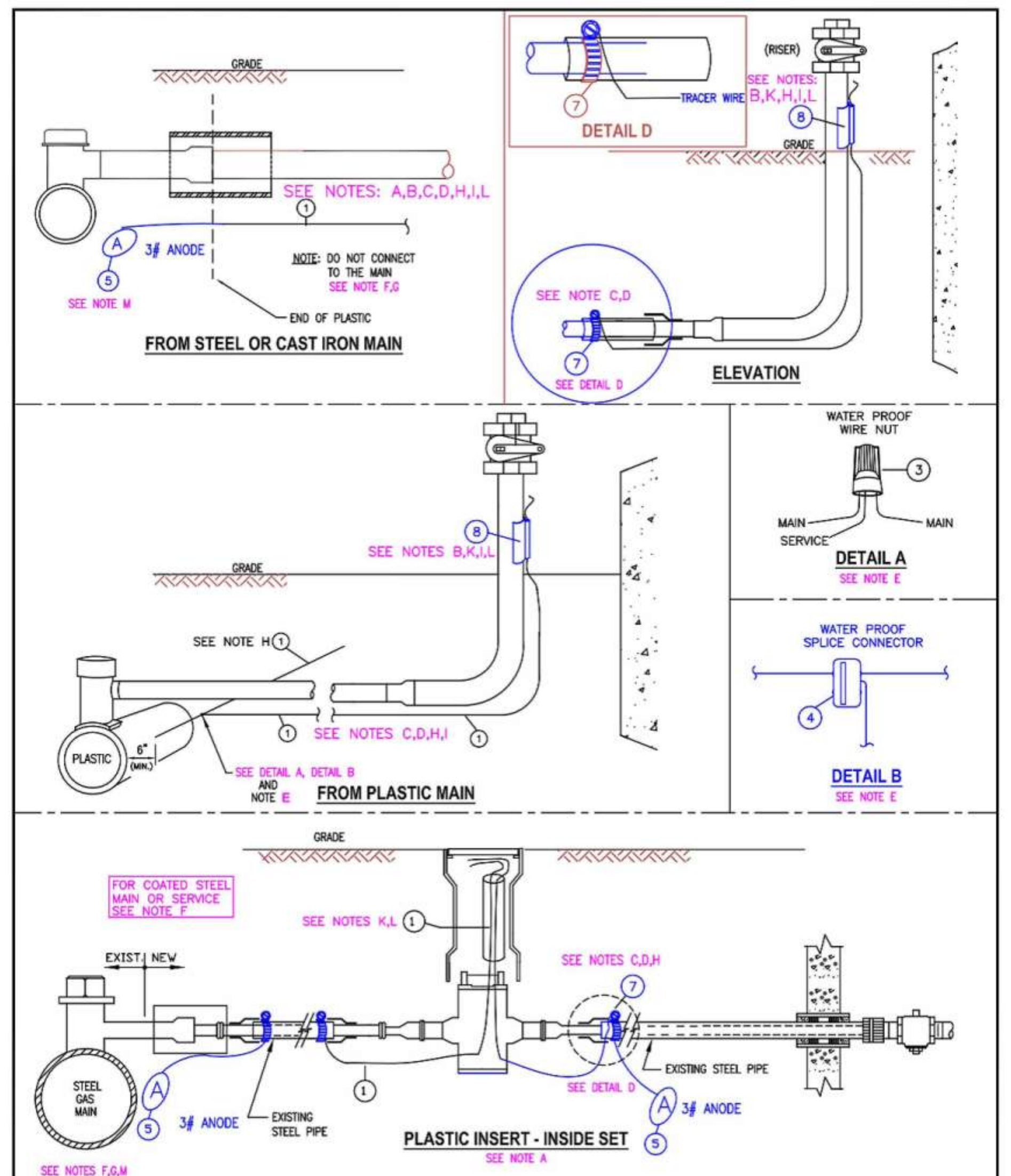

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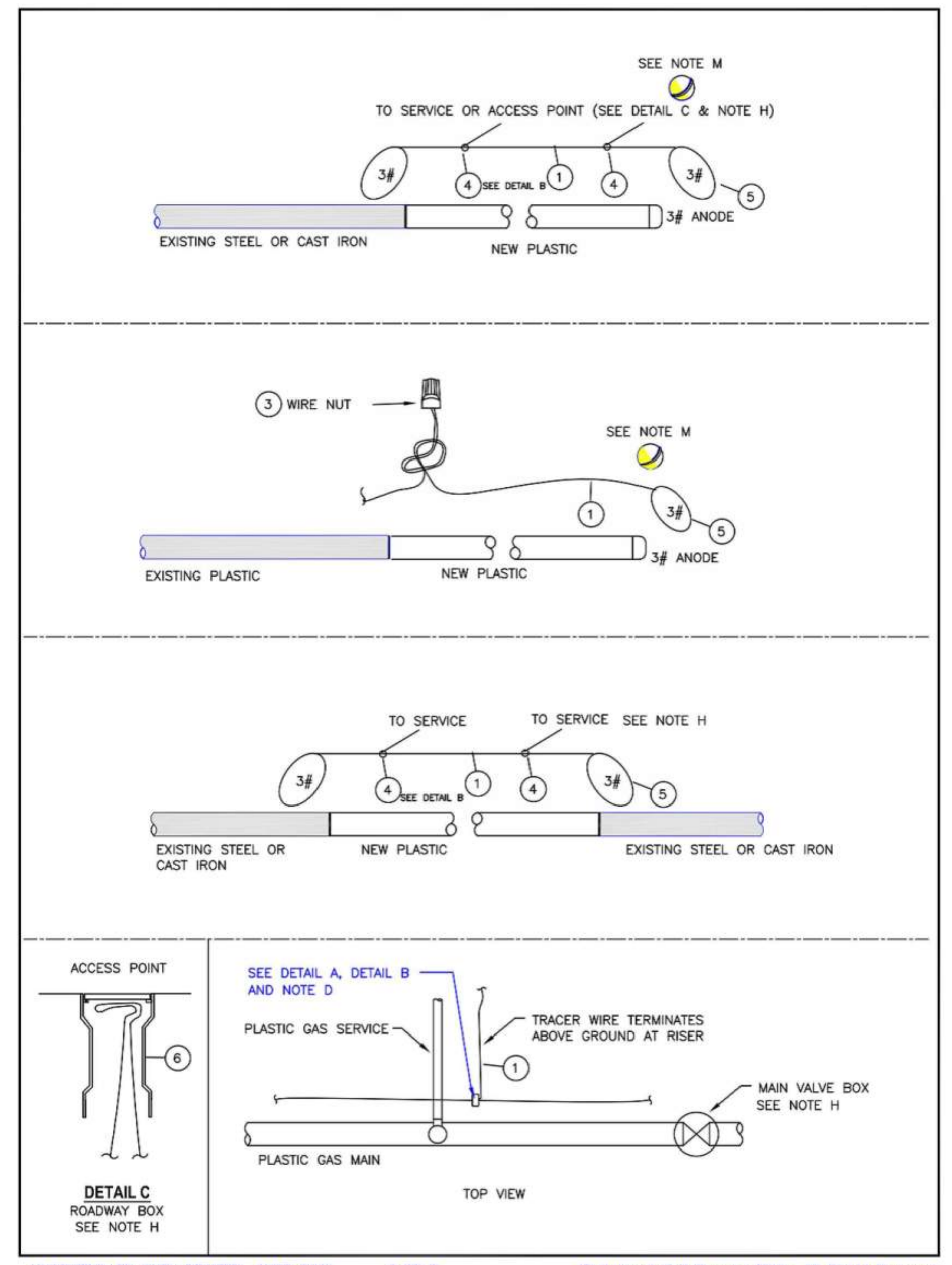
LI–MA–RI–UNY

TRACER WIRE INSTALLATIONS FOR PLASTIC MAINS AND SERVICES

REVISIONS: UPDATED ITEM 6/7's REVISED NOTES

DATE: 10/31/2004 | EFFECTIVE DATE: 06/25/2020
DESIGN: GUGLIOTTA / MCLOUGHLIN | STD. DWG. NO. CNST-6061
DRAWN: GUGLIOTTA / DIMAIO



		LI/NYC/ MASS	UNY/RI
8	TRACER WIRE SNAP, 2" (represents steel size)	9386134	9386134
8	TRACER WIRE SNAP, 1 ½" (represents steel size)	9386156	9386156
8	TRACER WIRE SNAP, 1" (represents steel size)	9386150	9386150
8	TRACER WIRE SNAP, ¾" (represents steel size)	9385568	9385568
7	CLAMP, STAINLESS	9331708	9307873
6	VALVE BOX, ROADWAY	9339890	9312344 UNY 9311208 RI
5	ANODE, 3 LB MAGNESIUM	9315645	9315645
4	WIRE SPLICE CONNECTOR, WATERPROOF	9308036	9308036
3	WIRE NUT, PLASTIC, WATERPROOF	9331644	9314631
2	WIRE, DIRECTIONAL DRILL, STAINLESS, STRANDED 10 AWG	9314187	9314187
1	TRACER WIRE, DIRECT BURY, COPPER, 12 AWG	9315005	9315005
NO.	ITEM	SAP ITEM ID	
BILL OF MATERIAL			

A. Inside sets: Terminate tracer wire in the curb valve box. Allow enough wire to extend 18" to 24" above grade.

B. Outside Sets: Tracer wire should be extended approximately 18" above grade at riser. Connect tracer wire to the riser using a "tracer snap", Item #8. If the appropriate tracer snap is not available, wrap or tie the tracer wire to the riser. Do not permanently attach tracer wire to the riser. Tracer wire should not exceed 6" above the point where it is secured to the riser.

C. Partially tubed services: When the abandoned portion of an existing steel service pipe is used as a sleeve for the new plastic, all cut out sections of the steel pipe to be inserted with plastic, shall be connected using a section of tracer wire to maintain continuity. If the existing service is coated steel , see Installation of Test Stations for Cathodic Protection [030026-CS] and Installation of Test Stations for Cathodic Protection [COR04003] or contact corrosion department for more guidance.

D. Thermite welding of tracer wire to abandoned steel service is only acceptable prior to insertion of the plastic tubing. See Installation of Test Stations for Cathodic Protection [030026-CS].

E. Plastic Mains: The service tracer wire shall be connected to the plastic main tracer wire using item #3 detail A or item #4 (detail B - preferred) in accordance with Installing Wire Connections [COR04004].

F. Coated Steel Mains: Do not connect the tracer wire to the steel main. See Installation of Test Stations for Cathodic Protection [030026-CS] and Installation of Test Stations for Cathodic Protection [COR04003] or contact corrosion department for more guidance.

G. Cast Iron or Bare steel Mains: Do not connect the tracer wire to the main. It is required in LI and MA, and suggested in all other areas to terminate the tracing wire with a 3# anode.

Tracer Wire Installation Notes

H. Install tracer wire in close proximity to the plastic pipe. Approximately 4" to 6" away from the pipe. LI & MA- Above or alongside, UNY- alongside, RI-Under or alongside. Exception: For trenchless pipe installations, the minimum clearance is waived.

I. Maintain separation of approximately 4" from service riser. Do not permanently connect the tracer wire to the riser.

J. For horizontal directional drill installations, use stainless wire, item #2.

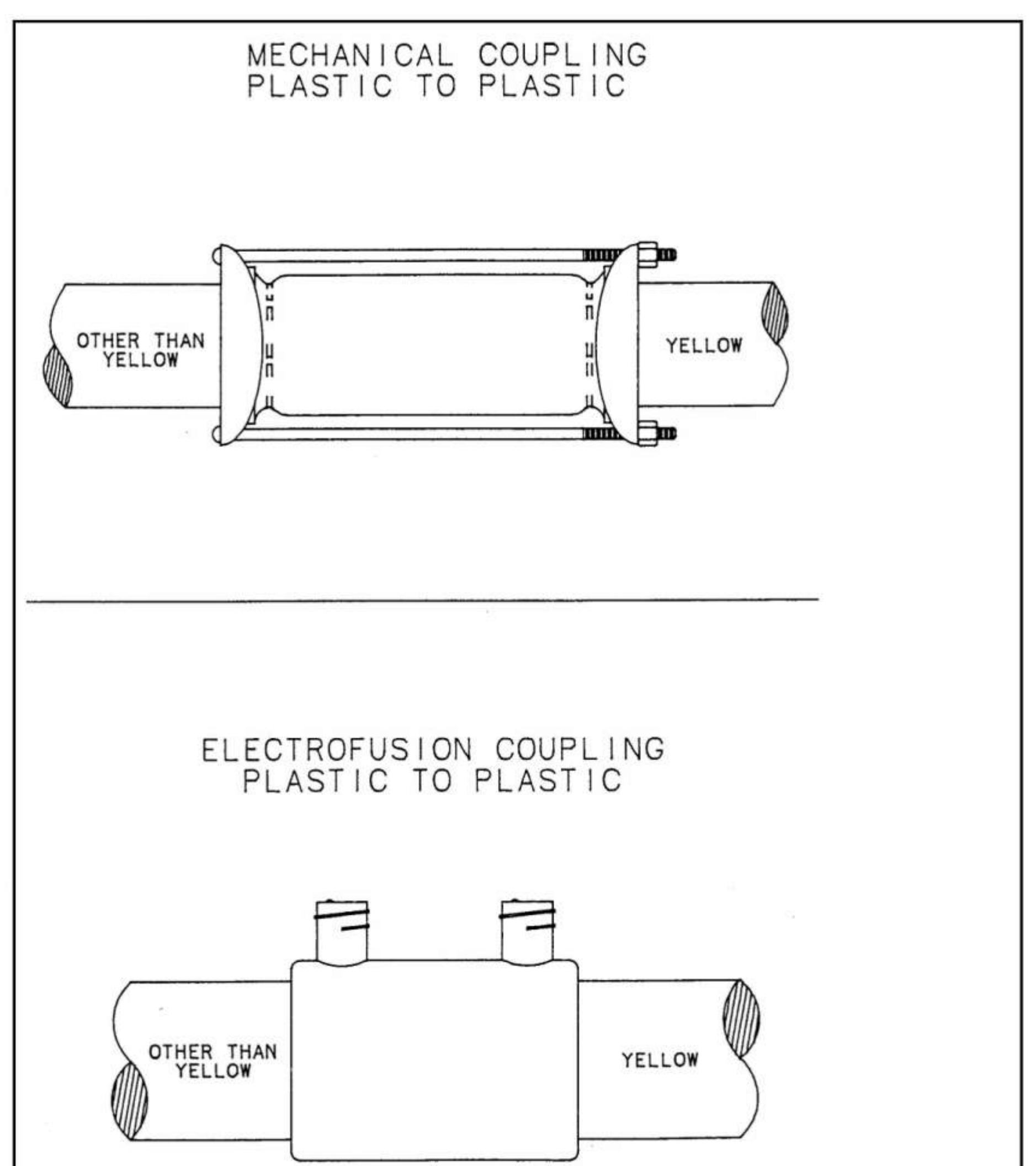
K. Tracer wire installed in boxes should allow enough wire to extend 18" to 24" above grade.

L. Verification: upon completion, the installer shall verify the location of the main or service using the tracer wire and locating device and perform a mark out using the conductive method.

M. LI and MA: Required to terminate the tracing wire with a 3# anode. This is to ground the tracer wire and increase signal strength when locating. This practice is recommended in all areas where signal strength is an issue.

Regional Notes

NYC ONLY: refer to Installation of Marker Tapes and EMS Pipeline Locators for Mains and Services [CNST6060-NYC] for installation of electronic marker ball in place of tracer wire.



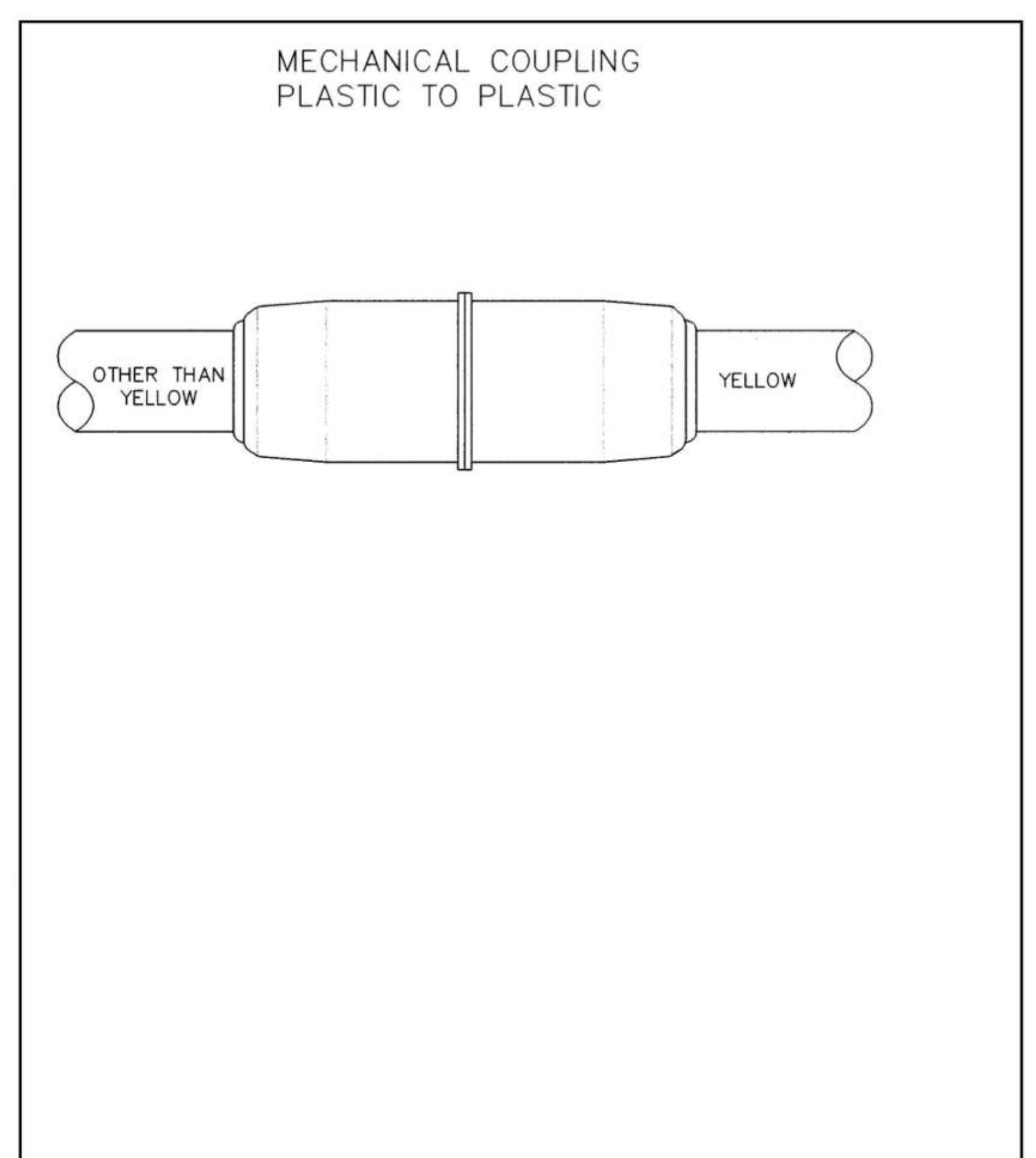
KEYSPAN Energy Delivery MA

Connection of Dissimilar Polyethylene Plastic Pipe Couplings

REVISIONS:

DATE: 7/1/2003 | EFFECTIVE DATE: 7/1/2003
DESIGN: ML | STD. DWG. No. MECH-6010
DRAWN: ML

SHT. 1 OF 1



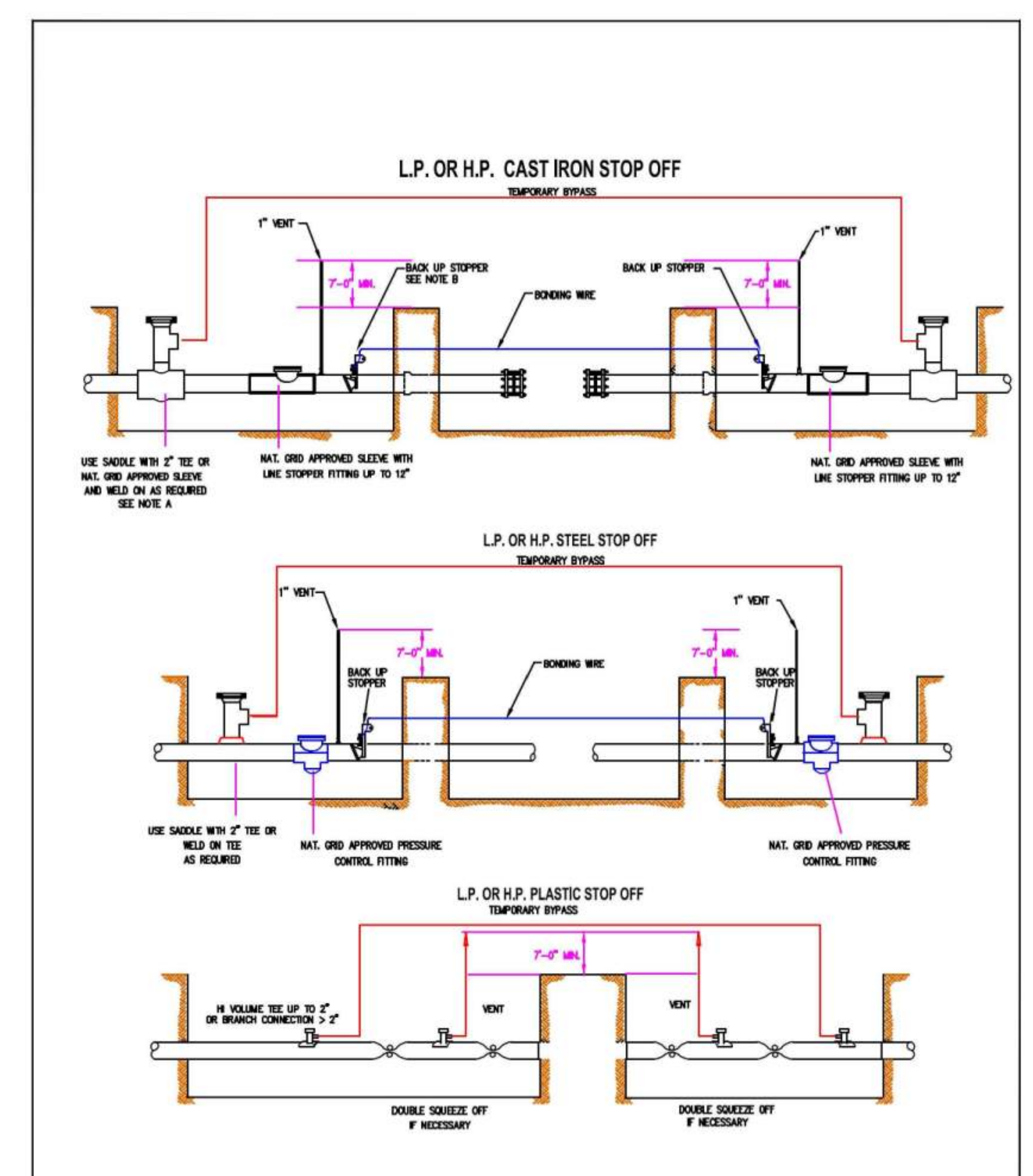
KEYSPAN Energy Delivery MA

Connection of Dissimilar Polyethylene Plastic Pipe Mechanical Coupling Alternate

REVISIONS:

DATE: 7/1/2003 | EFFECTIVE DATE: 7/1/2003
DESIGN: ML | STD. DWG. No. MECH-6030
DRAWN: ML

SHT. 1 OF 1



nationalgrid ALL REGIONS

TEMPORARY BYPASSES ON PLASTIC, CAST IRON OR STEEL MAINS

REVISIONS:

DATE: 05/15/2018 | EFFECTIVE DATE: 05/15/2018
DESIGN: F.B. | STD. DWG. NO. CS-LIVE002
DRAWN: P.G.

NOTES:

A. FOR BYPASSES ON THE LP SYSTEM ONLY SCREW TEES AND BAGHOLES MAY BE TAPPED DIRECTLY INTO THE MAIN.

B. BACK UP STOPPERS WILL BE REQUIRED IF INSUFFICENT STOP OFF CAN BE ACHIEVED OR IF WELDING BETWEEN THE STOPPERS WILL BE REQUIRED.

C. STOP OFF CAN BE PERFORMED USING MUELLER, T.D. WILLIAMSON, KLIESS, BAGS, OR OTHER APPROVED STOP OFF SYSTEMS.

SHT. 2 OF 2 CS-LIVE002

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COMMONWEALTH OF MASSACHUSETTS GARY W. PAVEK CIVIL No.52392 REGISTERED PROFESSIONAL ENGINEER

4/12/2023

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NO.	DESCRIPTION	DATE	DR.BY	CK.BY	APP.BY

BOSTON GAS COMPANY
d/b/a
nationalgrid
170 DATA DRIVE
WALTHAM, MA 02451

FINAL

PROPOSED GAS MAIN REPLACEMENT
81 UNION AVE
SUDBURY, MA

NATIONAL GRID STANDARD CONSTRUCTION DETAILS

DWG SIZE	DESIGNER	ENGINEER	DATE:	ASSET I.D.	W.O. NO.:
22"X34"	S. MARTIN	T. MARRI	08/06/2022	DISTRIBUTION	1469826

PAGE 7 OF 8

DRAWING NO.	SHEET NO.
DPL-SUD-067813-1231	C-303

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Horizontal Directional Drilling CNST01001

1. Purpose

The purpose of this document is to provide guidelines to install gas distribution pipe using Horizontal Directional Drilling (HDD) equipment.

a. This applies to plastic or steel main and service installations with an MAOP of 124 psig or less.
b. HDD approved for use by trained and qualified personnel.
c. For instructions specific to a particular tool, consult the Knowledge Base Tool Link.

2. Responsibilities

Construct & Maintain shall be responsible to:

- Notify the applicable One Call system in the area of the work
- Contact facility owners, property owners etc., to obtain location information for facilities not covered under the One Call system along the proposed route
- Positively locate utilities in the cross-bore path
- Inspection of all premises for sewer laterals within the project area
- Refer to Trenchless Pipe Installation Site Assessment Requirements [CNST01002] for site prep.

3. Personal & Process Safety

- All required PPE (Personal Protective Equipment) shall be worn and utilized in accordance with the current National Grid Safety Policy

STOP Trenchless Pipe Installation Site Assessment Requirements [CNST01002] shall be referred to before the start of any HDD operation.

- Before any powered equipment or mechanical means is used to excavate, a cable avoidance tool (CAT) shall be used to check the vicinity and the path of the drill operation.

⚠ The CAT tool should be checked daily prior to use.

- NIOSH/MSA approved N-100 filtering face piece mask shall be utilized when handling bulk Dry silica, bentonite or similar powdered products used for drilling fluid.
- Observe all permitting requirements, including environmental, especially the containment of bentonite
- Rubber-protecting equipment shall be used when underground electric is present in the vicinity of the trenchless technology path of the pipe installation.
  - Electrically insulated boots shall be worn by bore operator, rod helper and boring tool locator.
  - Electrically insulated gloves shall be worn when:
    - Bore operator stands on the ground alongside the rig while utilizing boring equipment
    - Bore operator and rod helper are manually loading from alongside the rig
  - Grounding mats shall be used when a rod helper is present
  - Rubber-protecting equipment shall be inspected before each use for damage and replaced, if necessary
- Electric Strike Alert
  - Electrical strike alert systems shall be tested for proper operation before the start of every bore.
  - If an electrical strike does occur:
    - Do not move from the grounding mats, truck or trailer
    - Retract rods one (1) stroke if drilling, never uncouple rods
    - Push rod one (1) stroke if back reaming, never uncouple rods
    - Have a crewmember contact the utility company to shut off electrical power
  - If you are on the ground:
    - Do not move from where you are standing
    - Do not step on to or off of the grid mats
    - Do not touch the boring unit, auxiliary power unit, trailer, truck or transport vehicle

⚠ The voltage difference between the equipment and ground as well as even between feet may be sufficient to cause injury or death.

  - Do not continue to bore until the utility company has given permission
  - Recheck the strike alert system before continuing to bore. It is possible that the electrical strike damaged the strike alert system.
- Remote lock-out devices
  - This is available on certain HDD equipment only
  - This device prevents accidental rod rotation
  - Where equipped, remote lock out devices shall be tested before the start of every bore. Operation shall not proceed if remote lockout devices are not operational

4. Operator Qualification Required Tasks [Qualified or Directed & Observed]

- Task 31 – Installation of Pipe
- Task 70 – Properties of Gas and Abnormal Condition

5. Content

Horizontal Directional Drilling (HDD) Operation
Operators shall not use pipe wrenches on drill rods or change drill heads unless the system lockout has been engaged (if equipped) and the unit is shutdown and the operator key removed.

Sub-grade soils consisting of large grain gravel, rock and buried debris may not be suitable conditions for use of HDD.
Establish, check and maintain proper radio communications between the operator and locator at all times during operations.
Drill the pilot hole from the sending pit to the receiving pit. Proceed with caution to prevent damage to substructures. Proper clearance between newly-installed underground facilities and substructures shall be maintained.
Ensure that the appropriate viscosity drilling fluid (mud) exists. The required amount and viscosity of the drilling mud will be a function of the soil conditions, drilling rate, cutting and hole size, pump capacity, etc. Possible changes in soil conditions along the drill path may make it necessary to change the viscosity of the drilling mud during the drilling operation.
Drilling mud will be used during drilling and back reaming. Use an adequately sized filter with the drill pump to prevent clogging of the drill head jets. Any residual mud from the operation should be disposed of in accordance with all applicable company and local regulations. At no time shall the effluent mud be allowed to enter any sewer or drainage system during discharge.
Cease drilling operations if an unidentifiable, atypical or unanticipated resistance or sudden movement of the drill string is encountered. All reasonable caution shall be exercised to ensure that sensitive facilities are not encountered. Particular care should be taken to ensure that existing substructures are not **penetrated.** If any substructure is known to be damaged as the HDD operation is preceding, notify the appropriate operator immediately. Proceed only after the source of the disturbance has been identified and/or eliminated and in the judgment and experience of the trained operator that continued HDD operations is safe to do so and will not further compromise the affected facility or Polyethylene (PE) pipe.
Prior to drilling but after backfilling test holes over subsurface structures, locations should be marked or staked with an approximate depth to ensure adequate clearance between the subsurface structures and the pipe as required. Use electronic locating equipment to continuously monitor the location of the drill head during the drilling operation and to accurately document the location of the pipe once installed.

Back Ream and Pullback
Plastic gas pipe shall be: • Supported and protected from sagging and dragging along the ground surface, substructures and the edges of the trench openings as it enters the borehole. • Required to use rollers when necessary • Butt-fused
Back ream the pilot hole while pulling the new underground facility into the enlarged borehole. Facility shall be pulled into the borehole at a constant rate that does not exceed the HDD equipment manufacturer's' recommendation.

For eight (8) inch and larger diameter installations, a pre-ream followed by a back ream process with progressively larger reamers may be required.
The reamer head must be inspected at previously made test excavations at perpendicular substructure crossing locations to ensure adequate clearance.
The diameter of the back reamed hole should typically be 1.5 times the nominal outside diameter of the pipe.
Inspection of PE pipe: • Inspect the surface of the plastic pipe for injurious damages (scratches and/or gouges that exceed 10% of wall thickness) • If such damages exist, check all visible plastic in any service and/or test opening excavations; determine the point of damage and remedy • Continue to pull the plastic pipe into the sending pit until it shows no evidence of such damages for a continuous length of approximately eight (8) feet
Inspection of steel pipe: • Inspect pipe for gouge or pipe-wrapping damage and make necessary repairs. • A swivel shall be utilized to prevent rotational torque being transferred to the product during pull-in
For PE gas installations, a breakaway link shall be installed in line between the swivel and the leading end of the pipe to: • Limit the Allowable Tensile Load (ATL) of the PE • Prevent over stressing of the facility being installed Combination break-away swivels may be used to limit the ATL. The link should be inspected prior to installation. Attachment 1: The ATL Table gives typical values for various size and density of PE pipe.
STOP When pulling PE pipe with a nominal diameter of one (1) inch or less, pullback by hand without the use of a breakaway link is permitted.
STOP At no time shall pullback of PE pipe be affected by mechanized means without the use of an approved breakaway device configured to the proper Allowable Tensile Stress as per Attachment 1.
Drill mud must be used with correct circulation flows and mixture to protect the pipe from damage.
The pipe should not be pulled after the drilling mud sets up. Stopping pullback is inadvisable except for the normal time it takes to change out the drill stem. Approximately 1% additional length of pipe should be provided to allow for thermal contraction and for joining to the next segment.
Excess drilling mud shall be removed from excavations and cleanup of "frac" outs must be completed prior to backfilling and final restoration. Recycling drilling fluid is a disposal alternative.

General Trenchless Operations
Tracer wire, either copper or stainless steel alloy, shall be installed and connected in such a manner that electronic locating of the plastic pipe will be possible.
Warning tape shall be installed at each end and over any other portions of the plastic pipe installed by direct burial.
At the conclusion of gas pipe installations, the newly installed facility location shall be marked at the surface with yellow paint, flags or line markers, as appropriate, in order to avoid third-party damages.

6. Knowledge Base & References (Click Here)

Knowledge Base		References
1 - Compliance History	5 - Job Aid	1 - Regulatory – Codes
2 - Data Capture	6 - Learning & Development	2 - Technical Documents
3 - Definitions	7 - Standard Drawings	3 - Tools Catalog
4 - Document History	8 - Tools & Equipment	

7. Attachments

Attachment 1: Allowable Tensile Loads (ATL)

Attachment 1: Allowable Tensile Loads (ATL)

Allowable Tensile Loads (ATL)*

Size	SDR (R)	Wall Thickness, in.	OUTSIDE DIAMETER (OD)	AVERAGE INSIDE DIAMETER (ID)	MDPE Tensile Yield Strength, psi	ATL MDPE (lbs)	HDPE Tensile Yield Strength, psi	ATL HDPE (lbs)
1/2 CTS	7	0.090	0.625	0.445	2600	156	3200	192
1 CTS	9	0.125	1.125	0.875	2600	N/A	3200	503
1 CTS	11	0.101	1.125	0.923	2600	N/A	3200	421
1 CTS	11.5	0.099	1.125	0.927	2600	328	3200	N/A
1 CTS	12.5	0.090	1.125	0.945	2600	304	3200	375
1.25 CTS	15.3	0.090	1.375	1.195	2600	378	3200	465
1.25 IPS	10	0.166	1.660	1.328	2600	811	3200	N/A
1.25 IPS	11	0.151	1.660	1.358	2600	N/A	3200	916
2 IPS	9	0.264	2.375	1.816	2600	N/A	3200	2241
2 IPS	11	0.216	2.375	1.917	2600	1524	3200	1875
3 IPS	11	0.318	3.500	2.864	2600	3309	3200	4072
3 IPS	11.5	0.304	3.500	2.892	2600	3179	3200	N/A
4 IPS	9	0.500	4.500	3.44	2600	N/A	3200	8045
4 IPS	11	0.409	4.500	3.663	2600	N/A	3200	6732
4 IPS	11.5	0.395	4.500	3.71	2600	5254	3200	N/A
6 IPS	9	0.736	6.625	5.064	2600	N/A	3200	17437
6 IPS	11	0.602	6.625	5.348	2600	N/A	3200	14591
6 IPS	11.5	0.576	6.625	5.473	2600	11389	3200	N/A
8 IPS	9	0.958	8.625	6.593	2600	N/A	3200	29553
8 IPS	11	0.785	8.625	6.963	2600	N/A	3200	24730
8 IPS	13.5	0.639	8.625	7.271	2600	16675	3200	20523
12 IPS	11	1.159	12.75	10.293	2600	N/A	3200	54041
12 IPS	13.5	0.945	12.75	10.748	2600	36439	3200	44849

*Notes:
1) ATL is based on 40% of the PE tensile yield strength @ 73 degrees F for pipe to fully recover from pulling deformation, per ASTM F1962.
2) Formula used for ATL is taken from ASTM F1804 section 5.2 $ATL = f_y f_t T_y \pi D^2 [1/R - 1/R^2]$
ATL = allowable tensile load, lb (N)
f_y = tensile yield design (safety) factor
f_t = time under tension design (safety) factor
T_y = PE material tensile yield strength, psi (MPa)
D = Pipe outside diameter, in (m)
R = pipe dimension ratio (DR or SDR)

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NO.	DESCRIPTION	DATE	DR.BY	CK.BY	APP.BY

BOSTON GAS COMPANY
d/b/a
nationalgrid
170 DATA DRIVE
WALTHAM, MA 02451

FINAL

PROPOSED GAS MAIN REPLACEMENT
81 UNION AVE
SUDBURY, MA

NATIONAL GRID STANDARD CONSTRUCTION DETAILS

DWG SIZE	DESIGNER	ENGINEER	DATE:	ASSET I.D.	W.O. NO.:
22"X34"	S. MARTIN	T. MARRI	08/06/2022	DISTRIBUTION	1469826

PAGE 8 OF 8

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Attachment C

Union Avenue & Codjer Lane Gas Main Replacement Project
Sudbury, MA
Notice of Intent

SITE PHOTOGRAPHS

BSC GROUP

Photo #1: View of Hop Brook from Union Ave bridge. *Facing southeast.*

Photo #2: View of the exposed gas main on Union Ave bridge. *Facing north.*

Photo #3: View of the exposed gas main on Union Ave. *Facing southwest.*

Photo #4: View of Hop Brook Union Ave. *Facing northwest.*

Photo #5: View of wetland SU-W1 on the west side of Union Ave. *Facing southwest.*

Photo #6: View of wetland SU-W1 on the west side of Union Ave. *Facing northwest.*

Photo #7: View of Union Ave over Hop Brook. *Facing southwest.*

Photo #9: View of Codjer Lane culvert. *Facing northwest.*

Photo #10: View of wetland SU-W2, on the north side of Codjer Lane. *Facing north.*

Photo #11: View of wetland SU-W2, on the north side of Codjer Lane. *Facing northwest.*

Attachment D

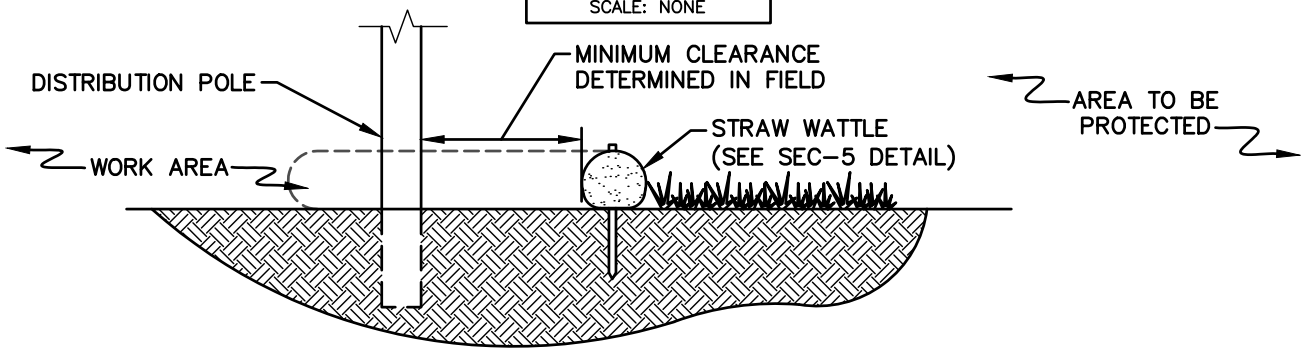
Union Avenue & Codjer Lane Gas Main Replacement Project
Sudbury, MA
Notice of Intent

EG-303NE Best Management Practices

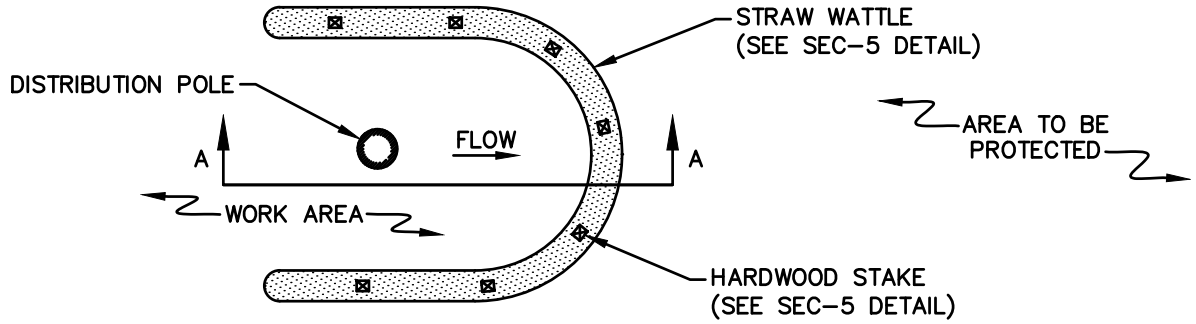
BSC Group

BMP DETAIL

SCALE: NONE



SECTION A–A



PLAN

NOTES

1. PRODUCT TO BE STRAW WATTLE OR APPROVED EQUAL BY NATIONAL GRID ENVIRONMENTAL SCIENTIST (SEE SEC–5 BMP DETAIL).
2. STRAW BALE BARRIER PER SEC–1 BMP DETAIL TO BE AN AVAILABLE ALTERNATE DEPENDING ON SITE CONDITIONS AT THE DIRECTION OF NATIONAL GRID ENVIRONMENTAL SCIENTIST (SEE FIGURE 2).
3. MINIMUM CLEARANCE BETWEEN POLE AND EROSION CONTROL TO BE DETERMINED BY CONDITIONS OF POLE INSTALLATION/REPLACEMENT WORK AND ASSOCIATED DISTURBANCE.

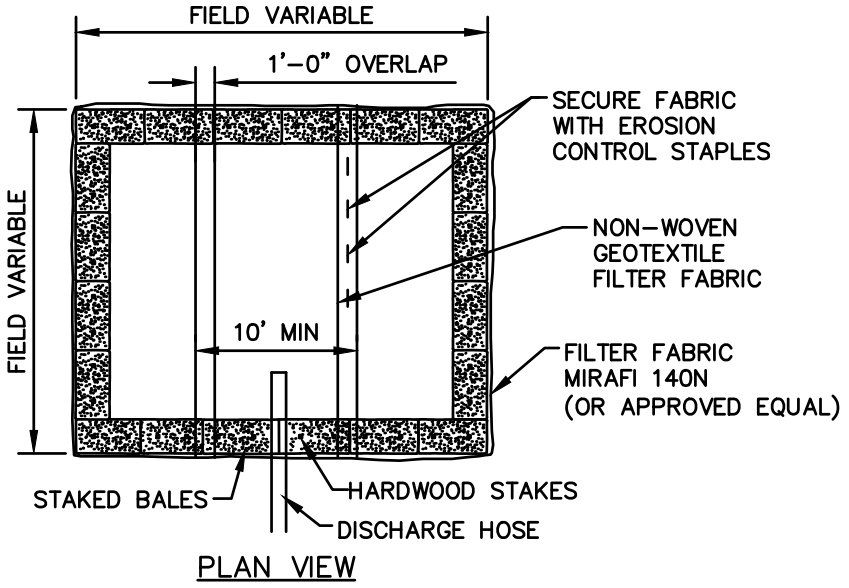
BMP PICTURE

FIGURE 1: TYP. STRAW WATTLE APPLICATION

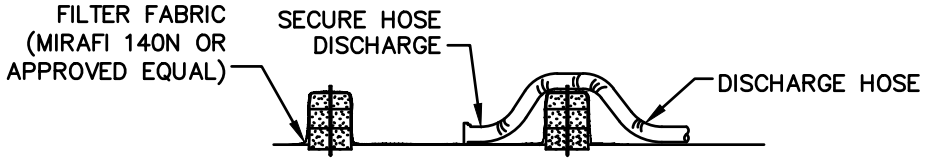
FIGURE 2: ALT. STRAW BALE APPLICATION

BMP DETAIL

SCALE: NONE



PLAN VIEW



CROSS–SECTION

NOTES:

1. NUMBER OF BALES MAY VARY DEPENDING ON SITE CONDITIONS,
2. THE BASIN TO BE SIZED TO PREVENT DISCHARGE WATER FROM OVERTOPPING BASIN.
3. KEEP AS FAR FROM WETLANDS AS PRACTICAL.
4. CLEAN AND REMOVE AS SOON AS DEWATERING IS COMPLETE.

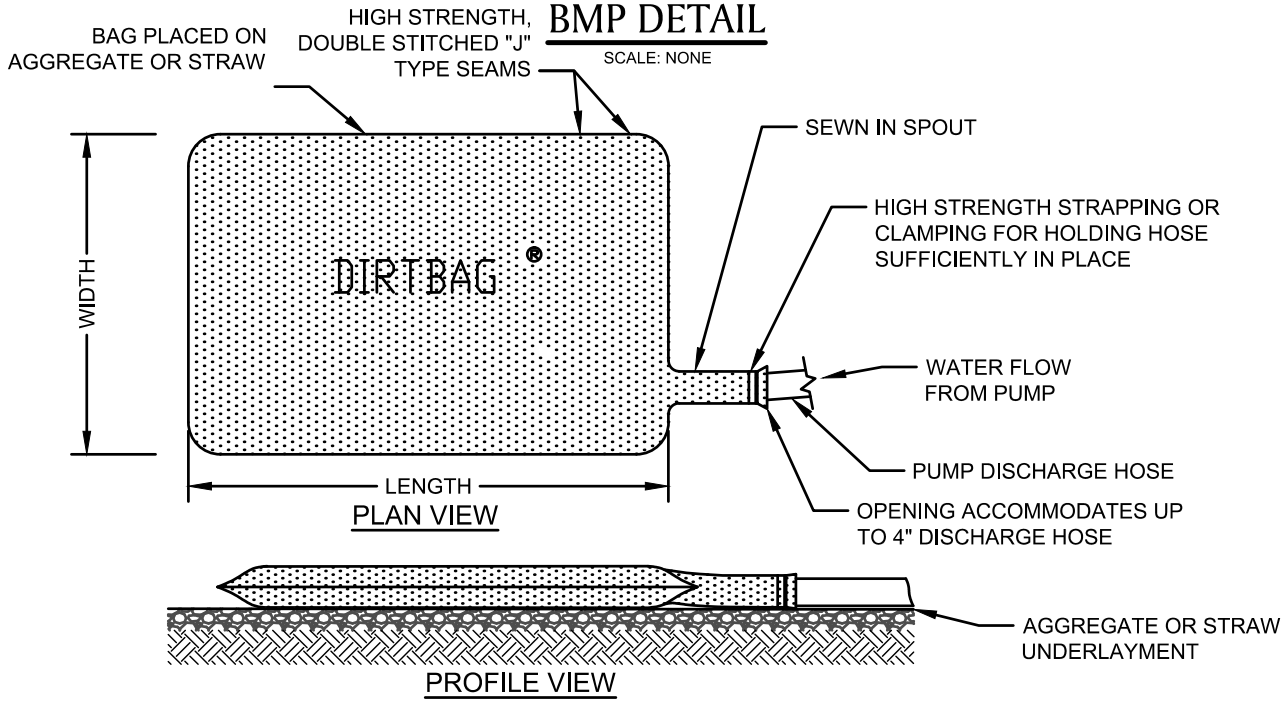
BMP PICTURE

AA-10
DEWATERING BASIN
(SMALL SCALE)

File: Dewat_Bas_Small.dwg

BMP DETAIL

SCALE: NONE



NOTE:
ONCE PUMPING COMMENCES, THE DIRT BAG SHALL BE MONITORED FREQUENTLY TO ASSURE THAT THE CONNECTIONS ARE SECURELY FASTENED AND THE RATE OF WATER DELIVERY TO THE STRUCTURE IS LOW ENOUGH TO PREVENT UNFILTERED WATER FROM FLOWING FROM THE HOSE CONNECTIONS OR BAG.

BMP PICTURE

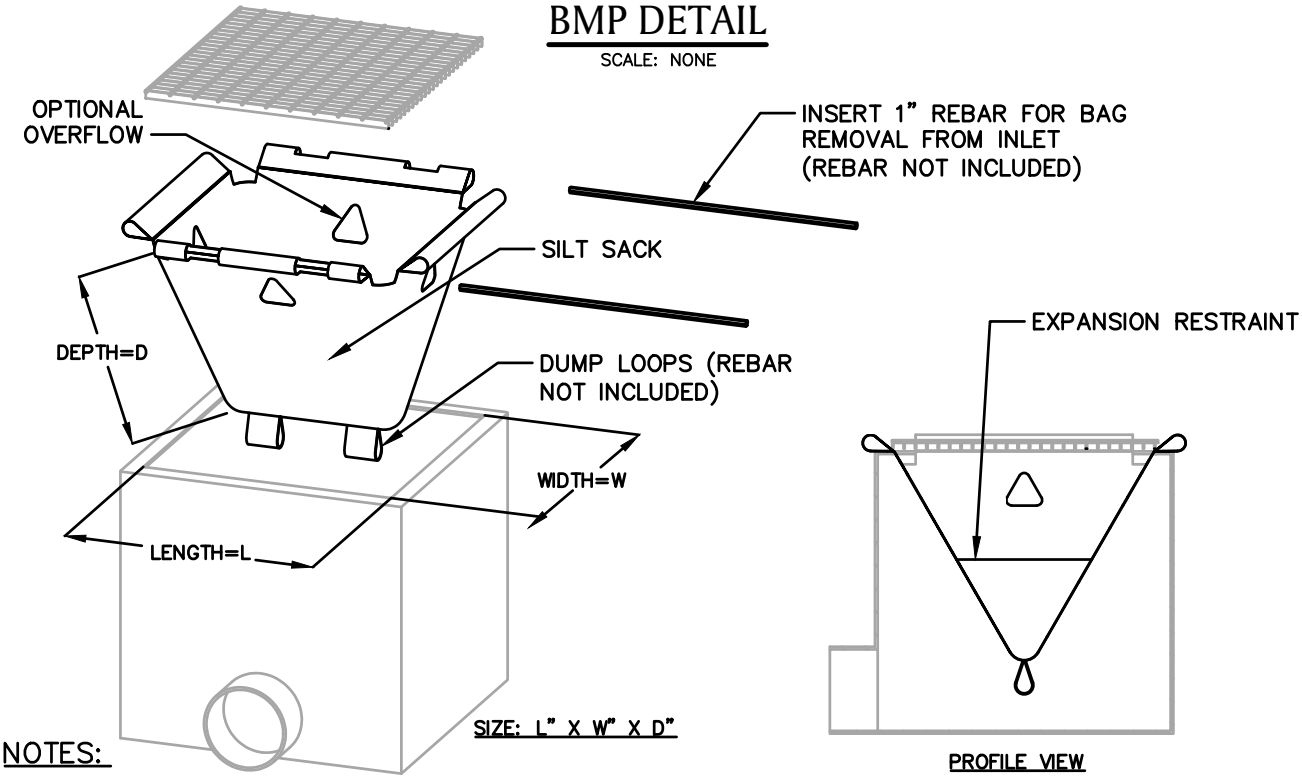
* PICTURE AND DETAIL PROVIDED BY ACF ENVIRONMENTAL

AA-12
DIRTBAG *

File: Dirtbag.dwg

BMP DETAIL

SCALE: NONE



NOTES:

1. PRODUCT TO BE SILT SACK OR APPROVED EQUAL BY NATIONAL GRID ENVIRONMENTAL SCIENTIST.
2. THE USE OF A SILT SACK OPTIONAL OVERFLOW AND OVERALL DIMENSIONS ARE TO BE COORDINATED WITH A NATIONAL GRID ENVIRONMENTAL SCIENTIST.

BMP PICTURE

*** DETAIL PROVIDED BY ACF ENVIRONMENTAL**

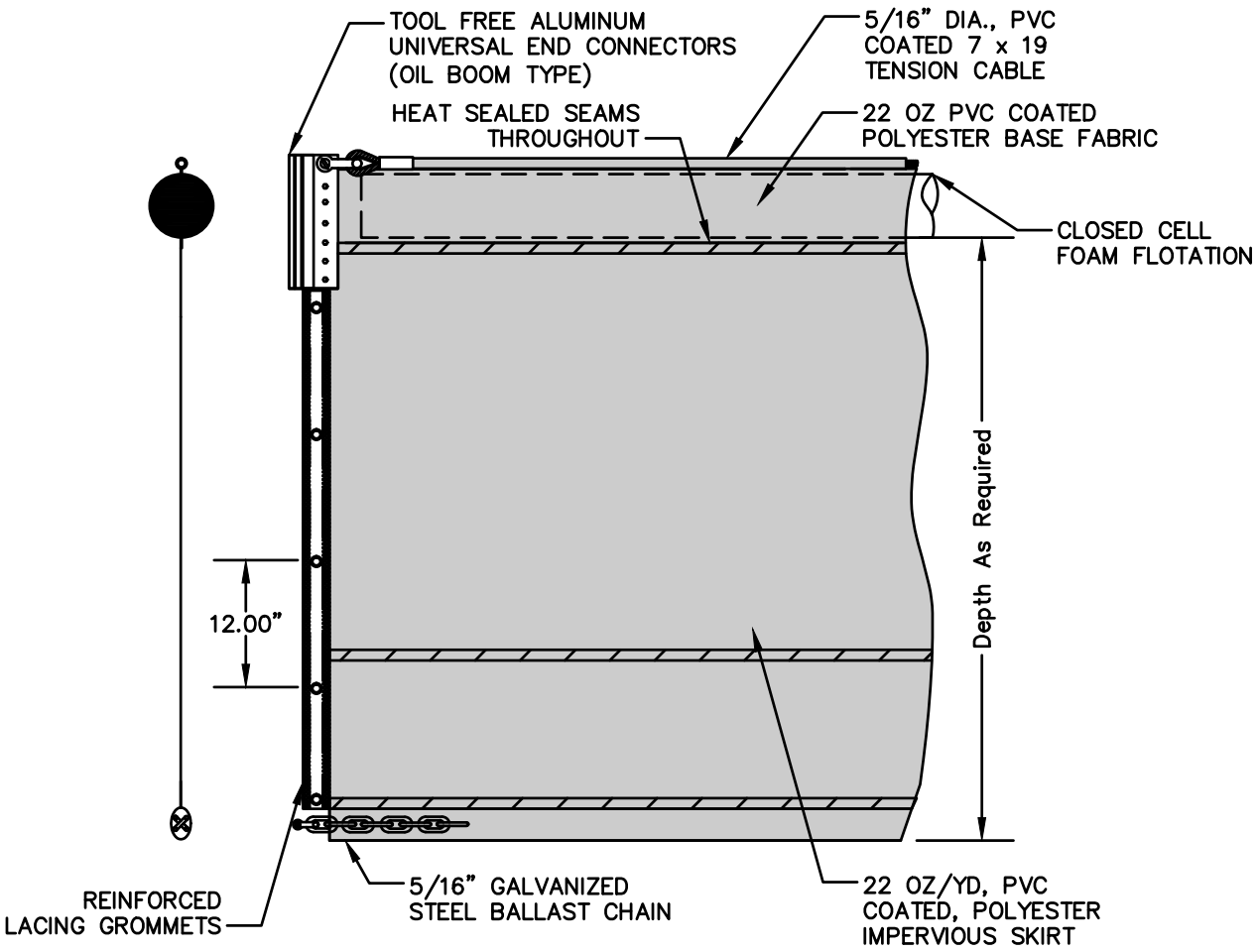
APPROVED BY: VICE PRESIDENT, ENVIRONMENTAL SERVICES

AA-20
SILT SACK *

File: SILT SACK.dwg

BMP DETAIL

SCALE: NONE



BMP PICTURE

*** DETAIL PROVIDED BY BROCKTON EQUIPMENT / SPILLDAM INC.**
APPROVED BY: VICE PRESIDENT, ENVIRONMENTAL SERVICES
PRINTED COPIES ARE NOT DOCUMENT CONTROLLED. FOR LATEST AUTHORIZED VERSION PLEASE REFER TO THE NATIONAL GRID ENVIRONMENTAL INFONET SITE.

AA-21
TURBIDITY CURTAIN *

File: Turbidity_Curtain.dwg

Attachment E

Union Avenue & Codjer Lane Gas Main Replacement Project
Sudbury, Massachusetts
Notice of Intent

Abutter Notification Letter
Certified List of Abutters
affidavit of service- to be provided

BSC GROUP

Notification to Abutters
Under the Massachusetts Wetlands Protection Act
and the Sudbury Wetlands Administrative Bylaw

In accordance with the second paragraph of Massachusetts General Laws Chapter 131, Section 40, you are hereby notified of the following:

A. The name of the **Applicant** is Boston Gas Company

B. The Applicant has filed a Notice of Intent with the Sudbury Conservation Commission seeking permission to work in an Area Subject to Protection (Wetland Resource Area and/or Buffer Zone) under the Massachusetts Wetlands Protection Act (General Laws Chapter 131, Sec.40) and the Town of Sudbury Wetlands Administrative Bylaw.

C. The **address** of the lot where the activity is proposed: Union Ave & Codjer Lane, Sudbury MA

D. The **proposed activity** is: Boston Gas Company (BGC) proposes to replace existing gas mains at the intersection of Union Avenue and Codjer Lane in Sudbury, MA. Proposed activities include the abandonment of approximately 270 feet of 3-inch plastic and coated steel at the culvert crossing and replacement of approximately 300-feet of 4-inch plastic via open trench and HDD methodology.

E. A **Public Hearing** regarding this Notice of Intent will be held on:
Monday, November 13th **at 6:30 PM.**

F. **Public Participation will be via Virtual Means Only** - In light of the ongoing COVID-19 coronavirus outbreak, Governor Baker issued an emergency Order on March 12, 2020, allowing public bodies greater flexibility in utilizing technology in the conduct of meetings under the Open Meeting Law. The Town of Sudbury Conservation Commission greatly values the participation of its citizens in the public meeting process, but given the current circumstances and recommendations at both the state and federal levels to limit or avoid public gatherings, including Governor Baker's ban on gatherings of more than 10 people, together with the present closure of Sudbury Town Hall and other public buildings to the public, the Town has decided to implement the "remote participation" procedures allowed under Governor Baker's emergency Order for all boards, committees, and commissions.

G The public may participate in this meeting via Remote Participation:

From your computer, smart phone or tablet:

- https://zoom.us/j/98803339162
- Meeting ID: 988 0333 9162
- From your phone: **978-639-3366** or **470 250 9358**

H Copies of the Notice of Intent may be examined by visiting this Website:
https://sudbury.ma.us/conservationcommission/meetings/

I. Copies of the Notice of Intent may be obtained from either The Applicant, or the Applicant's representative Carolyn Gorss, BSC Group, by calling this telephone number: (617) 896-4341 between the hours of 9am-5pm

Note: Public Hearing Notice, including its date, time, and place, will be published at least 5 days in advance in either the Sudbury Crier or MetroWest newspapers (at the applicant's expense).

abutters_id_field	abutters_owner1	abutters_owner2	abutters_address	abutters_address2	abutters_town	abutters_state	abutters_zip	abutters_bookpage	abutters_location
J08-0002	SUDBURY WATER DISTRICT		199 RAYMOND RD		SUDBURY	MA	01776	12668-388	WASH BROOK RD
J08-0004	CODJER LANE LLC		112 CODJER LANE		SUDBURY	MA	01776	48795-63	110 CODJER LN
J08-0004	CODJER LANE LLC		112 CODJER LANE		SUDBURY	MA	01776	48795-63	110 CODJER LN
J08-0004	CODJER LANE LLC		112 CODJER LANE		SUDBURY	MA	01776	48795-63	110-2 CODJER LN
J08-0006	CAVICCHIO FAMILY REAL	ESTATE LLC	110 CODJER LANE		SUDBURY	MA	01776	76537-294	0 CODJER LN
J08-0008	DEMPSEY MARIE T TRS	RHODES ROBERT S TRS	151 UNION AVE		SUDBURY	MA	01776	60758-596	151 UNION AVE
J08-0009	TOWN OF SUDBURY	CONSERVATION COMMISSION	278 OLD SUDBURY RD		SUDBURY	MA	01776	31017-194	UNION AVE
J08-0010	ZOU FAYE		143 UNION AVE		SUDBURY	MA	01776	65711-30	143 UNION AVE
J08-0011	HYMAN DANIELLE & DAVID		41 MEADOW DRIVE		SUDBURY	MA	01776	80178-351	41 MEADOW DR
J08-0021	FLEISHER VERONIKA & MAXIM		172 UNION AVE		SUDBURY	MA	01776	66679-516	172 UNION AVE
J08-0022	SUDBURY VALLEY TRUSTEES INC		18 WOLBACH RD		SUDBURY	MA	01776	14360-550	UNION AVE
J08-0023-0-A	KIRK DAVID G JR & JAMES E TRS	KIRK DENTAL REALTY TRUST	57 CODJER LN STE 1		SUDBURY	MA	01776	58321-550	57 CODJER LN UNIT A
J08-0023-0-B	KIRK JAMES E & DAVID G JR	TRUSTEES KIRK DENTAL	57 CODJER LN UNIT 2		SUDBURY	MA	01776	67370-492	57 CODJER LN UNIT B
J08-0023-0-C	CODJER LANE REALTY LLC		57 CODJER LN UNIT 3		SUDBURY	MA	01776	75177-6	57 CODJER LN UNIT C
J08-0024	CAVICCHIO PAUL F TRS PNJ 1995 RT		110 CODJER LN		SUDBURY	MA	01776	30068-110	53 CODJER LN
J08-0025	BALDWIN WILLIAM F &	GERALDINE W TRS	47 CODJER LN		SUDBURY	MA	01776	56582-151	47 CODJER LN
J08-0026	GABLE KENNETH LEE &	GABLE CLARISSA REMIGIO	41 CODJER LANE		SUDBURY	MA	01776	78162-589	41 CODJER LN
J08-0029	JOYAL PAUL M & LORI ANN		30 CODJER LANE		SUDBURY	MA	01776	22071-35	30 CODJER LN
J08-0035	CHANG OTTO Y		177 UNION AVE		SUDBURY	MA	01776	81665-391	177 UNION AVE
J08-0036	BAGNALL DANIEL & AEREE		173 UNION AVE		SUDBURY	MA	01776	81494-238	173 UNION AVE
J08-0116	GEORGE GREGORY A & CHRISTINE	CARLO	39 MEADOW DRIVE		SUDBURY	MA	01776	57353-44	39 MEADOW DR
J08-0117	MCCARTHY JOHN F & CATHERINE A		40 MEADOW DRIVE		SUDBURY	MA	01776	22342-368	40 MEADOW DR
J08-0118	PIERSON JOHN E		34 MEADOW DR		SUDBURY	MA	01776	81477-184	34 MEADOW DR
J08-0119	PALAKURTHI ANOKH &	ARMSTRONG KIMBERLY	30 MEADOW DR		SUDBURY	MA	01776	80457-200	30 MEADOW DR
J08-0200	AKRIVOULIS VASILIOS		128 UNION AVE		SUDBURY	MA	01776	43621-311	128 UNION AVE
J08-0201	DELAGRAVE SIMON		138 UNION AVE		SUDBURY	MA	01776	81092-402	138 UNION AVE
J08-0203	JACKSON AARON L		5 TAYLOR ROAD		SUDBURY	MA	01776	40191-0016	5 TAYLOR RD
J08-0204	EPI PAUL A & JUDITH		6 TAYLOR RD		SUDBURY	MA	01776	17341-408	6 TAYLOR RD
J08-0205	JOYAL PAUL M & LORI ANN		30 CODJER LN		SUDBURY	MA	01776	69774-339	CODJER LN
J08-0400	JANEY JACOB & CHRANG CHRISTINA		135 UNION AVE		SUDBURY	MA	01776	78595-479	135-2 UNION AVE
J08-0400	JANEY JACOB & CHRANG CHRISTINA		135 UNION AVE		SUDBURY	MA	01776	78595-479	135 UNION AVE
J08-0501	CAVICCHIO FAMILY REAL	ESTATE LLC	110 CODJER LANE		SUDBURY	MA	01776	76537-294	0 CODJER LN
J08-0502	CAVICCHIO FAMILY REAL	ESTATE LLC	110 CODJER LANE		SUDBURY	MA	01776	76537-294	0 CODJER LN
J08-0503	CAVICCHIO FAMILY REAL	ESTATE LLC	110 CODJER LANE		SUDBURY	MA	01776	76537-294	0 CODJER LN
K08-0038	UNION AVENUE REALTY, LLC		46 UNION AV		SUDBURY	MA	01776	1456-81	0 STATION RD
K08-0046	MACOT REALTY TRUST	C/O ELEANOR M UDDO ESQ	50 NORTHGATE ROAD		WELLESLEY	MA	02481	23137-404	64 UNION AVE
K08-0047	MKL UNION LLC		80 UNION AVE		SUDBURY	MA	01776	59283-417	80 UNION AVE
K08-0050	TUCKER PROPERTIES LLC		75 UNION AVE		SUDBURY	MA	01776	53165-230	75 UNION AVE
K08-0050	TUCKER PROPERTIES LLC		75 UNION AVE		SUDBURY	MA	01776	53165-230	81 UNION AVE
K08-0051	MACOT REALTY TRUST	C/O ELEANOR M UDDO ESQ	50 NORTHGATE ROAD		WELLESLEY	MA	02481	63090-389	65 UNION AVE
K08-0055	MCCARTHY LAURA B ET AL TRUSTEE S	CAS TRUST	578 BOSTON POST RD		SUDBURY	MA	01776	26825-536	UNION AVE
K08-0087	MACOT REALTY TRUST	C/0 ELEANOR M UDDO ESQ	50 NORTHGATE ROAD		WELLESLEY	MA	02481	63090-389	71 UNION AVE
K08-0101	HUGHES CLIFFORD		PO BOX 1542	2 ORCHARD LN	MANCHESTER	MA	01944	27781-508	CONCORD RD
K08-0105	CAVICCHIO FAMILY REAL	ESTATE LLC	110 CODJER LANE		SUDBURY	MA	01776	76537-294	CODJER LN
K08-0304	CAVICCHIO FAMILY REAL ESTATE	LLC	110 CODJER LANE		SUDBURY	MA	01776	76537-301	OFF CONCORD RD
K08-5100	EOT	MASS BAY TRANSPORTATION	10 PARK PLAZA		BOSTON	MA	02116	13117-113	RAILWAY
J08-5100	EOT	MASS BAY TRANSPORTATION	10 PARK PLAZA		BOSTON	MA	02116	13117-113	RAILWAY

abutters Codjer Lane - Vine Ave 100'

Cynthia W Terry
Director of Assessing - Town of Sudbury
10/16/2023

Attachment F

Union Avenue & Codjer Lane Gas Main Replacement Project
Sudbury, Massachusetts
Notice of Intent

HDD Contingency Plan

BSC GROUP

HDD Overview and Contingency Plan Purpose

HDD is a method of creating a crossing path beneath a surface without intruding directly on that surface area, compared to conventional open-cut trenching methods where the surface feature(s) would otherwise sustain direct disturbance. HDD uses specific drilling equipment capable of boring a drill path at a shallow inclined angle into the subsurface, and steering the borehole at depth beneath a surface feature(s), such as a stream, roadway, railroad, or combination of these features, and re-emerging within an excavation pit on the other side of the designated surface area. Once the borehole is created, it is successively reamed by larger bits until the borehole is wide enough for pre-assembled pipeline to be pulled through the borehole. Pipeline segments are connected to the two ends of the HDD segment once it has been successfully pulled back through the HDD borehole.

HDD drilling requires specialized drilling equipment to allow shallow-angled entry of a drill bit, steering and remote telemetry tracking of the drill head and advancing the drill string by addition of successive segments of drill pipe until a pre-determined exit point is reached. HDD requires drill "mud" to be pumped down the drill string through the head of the drill bit. Drill mud is required for several critical functions:

- It cools the drill head and string as it grinds through soil and/or rock;
- It helps to lubricate and support the borehole side-walls while the bit and drill string pass through;
- It provides a fluid to carry rock and soil cuttings in suspension from the drill path face back to the point of entry so the cuttings can be cleared from the HDD borehole path; and
- It assists in stabilizing an open bore hole, by exerting positive pressure on the borehole wall and through the buildup of a wall cake, also produces a bridging mechanism to hold soil particles in place.

The drill mud must be maintained under pressure within the borehole in order to carry out all of these functions.

HDD crossings are specifically designed to follow a pre-determined path to carry the boring at depths below the surface area being crossed so as to avoid disturbance of the surface area and create a borehole of sufficient diameter and configuration to allow the conduit to pass through the completed borehole smoothly from end to end once the HDD is completed.

Despite specific engineering design of an HDD crossing, it is possible to unexpectedly lose circulation of the drill mud. Lost circulation may be signified by unexpected drop of the desired pressure of the drill mud, failure of it to return to the borehole entry point, or change in other monitored conditions during HDD drilling. A "inadvertent return" is the condition where drilling mud is inadvertently

released through the soil stratigraphy or fractured bedrock and travels to the surface. Because drill mud must be maintained under pressure the potential for an inadvertent return tends to be greatest where the HDD drill path is near the entry or exit points of the drill. Other features, such as unexpected geologic fractures or material may also provide pathways for loss of pressure and circulation that could lead to inadvertent returns at other points along an HDD drill path.

Drilling muds consist largely of a bentonite clay-water mixture, sometimes with non-toxic polymer additives to maintain specific viscosity, density or other properties. Bentonite is a naturally occurring type of clay, is non-toxic and commonly used in farming practices.

The purpose of this Contingency Plan is to:

- Minimize the potential for an inadvertent return associated with HDD activities
- Provide for the timely detection of lost drilling mud circulation and the inadvertent return(s) that may result
- Protect areas that are considered environmentally sensitive (streams, wetlands, other ecological resources, cultural resources)
- Ensure and establish organized, timely, and "minimum-impact" response procedures to address loss of circulation and inadvertent return loss and the proposed clean-up of the event.
- Provide for notifications to the applicable parties and regulatory agencies, in the event an inadvertent drilling mud loss occurs.

Measures to be deployed as part of this contingency plan include site inspection, proper training of the contractor and construction personnel, development of response procedures, deployment of containment materials ahead of drilling and at locations to allow timely and minimum impact use of the materials, and implementation of appropriate clean up procedures. These measures are described in detail below.

Site Personnel Responsibilities

National Grid has overall responsibility for implementing this contingency plan. National Grid will be familiar with the aspects of the HDD drilling and plan for the project, the contents of this contingency plan and the conditions of approval under which the activity is permitted to take place. National Grid will provide a copy of this plan to its construction personnel involved with performance of and potential response to the HDD crossing. National Grid will ensure that workers are properly trained and familiar with the necessary procedures for response to an inadvertent return, prior to initiation of drilling operations. National Grid will provide the anticipated schedule of HDD operations around protected streams, rivers, wetlands, cultural resource sites and other features (non- road, structure or railroad bores) to the site inspector responsible for monitoring environmental compliance ("Environmental Inspector" or "EI").

Monitoring of HDD operations by National Grid will include the following parameters in order to evaluate and detect potential loss of circulation or inadvertent return during drilling operations:

- Monitor the direction, progress and telemetry of the drill head and drill string along the designed HDD drill path.
- Monitor the condition and character of soil & rock cuttings emerging from the borehole for consistency with geologic conditions anticipated along the drill path.
- Monitor drill mud pressure for unexpected changes (particularly decreases in pressure) as the borehole is advanced.
- Perform visual monitoring of the ground surface along the drill path for signs of inadvertent return (unexpected expansion cracks or emergence of drill mud)

Field crews will provide timely notifications and responses to observed inadvertent returns in accordance with procedures identified in the contingency plan.

Notifications

Upon indication of a potential loss of circulation, National Grid shall notify the drill foreman & appropriate drilling personnel to temporarily suspend drilling operations until verification can be made that an inadvertent return has not occurred. If it is determined that an inadvertent return has occurred, the drilling procedure will be discontinued until clean-up and repair has been successfully implemented and Owner has authorized drilling to commence.

National Grid shall also notify its response personnel to implement containment and response procedures summarized below.

National Grid and the host utility will have the authority to stop work and commit the resources (personnel and equipment) necessary to implement this plan. National Grid and/or the Construction supervisor are responsible for promptly notifying the host utility of the inadvertent return, and coordinating personnel to oversee proper clean-up and disposal of recovered material. The host utility will be on the ROW, available during drilling operations to consult with HDD personnel and conduct inspections. The host utility will inspect the drilling operation (e.g., monitoring HDD drill path during pilot hole operations) for the purpose of identifying signs of inadvertent return and will coordinate with the Construction supervisor to implement the appropriate measures to address an inadvertent return. Should an inadvertent return occur, the host utility will evaluate the situation and location, and will determine the appropriate level of response to the incident based on the guidelines contained in this contingency plan. To the extent practicable, the host utility will consult with Owner before determining the appropriate level of response to the incident.

Training

Prior to the start of construction, the Construction supervisor and EI will verify that the construction field crew members receive the following site-specific training:

- review provisions of the contingency plan, equipment maintenance and site-specific permit and monitoring requirements;
- review location of sensitive environmental resources at the site and relevant permit conditions, including any cultural resource site locations, avoidance or restriction measures;
- review inspection procedures for inadvertent return prevention and be familiar with containment equipment and materials;
- review contractor/crew obligations to temporarily suspend forward progress of the drilling upon first evidence of the occurrence of lost circulation and potential inadvertent return, and to report any observed inadvertent returns to the EI;
- review operation of inadvertent return control equipment and the location of inadvertent return control materials, as necessary and appropriate; and
- review protocols for reporting observed inadvertent returns and project team communication with appropriate regulatory agencies.

Pre-Construction Considerations:

Prior to construction, environmental and cultural resources will be protected by implementing the following measures:

- Environmental, biological and cultural surveys, clearances and applicable permitting for proposed HDD and associated workspace(s) will have been completed prior to commencing drilling operations in order to minimize potential impacts to resources.
- Where present, sensitive resources within the construction right-of-way (CROW) will be flagged for avoidance, restricted activity locations, and construction limits will be clearly marked.
- Barriers (straw bales or sedimentation fences) will be erected between the bore site and nearby sensitive resources within or bounding the edge of the CROW prior to drilling, as appropriate, to prevent the potential for released material to reach resources nearby.
- On-site briefings will be conducted for the workers to ensure they have received site specific training for the HDD drilling operations and contingencies for drilling fluid inadvertent return procedures and clean-up.
- Ensure that all field personnel understand their responsibility for timely reporting of inadvertent returns.

- Maintaining necessary response equipment on-site or at a readily accessible location(s) and in good working order.

The drilling entry and exit areas will be clearly marked, surrounded by construction fencing and silt fencing to minimize the potential for on-site migration of drilling mud. Access and egress locations will be designated and clearly marked.

The primary areas of concern for inadvertent returns typically occur near the entrance and exit points where the drill bit and leading parts of the drill string is at depths of less than 20 feet deep. The likelihood of inadvertent return decreases as the depth of the pipe increases.

Inadvertent Return Contingency Response Plan

If an inadvertent return is suspected:

- National Grid will temporarily suspend all HDD drilling operations immediately upon a substantive lack of drilling fluid return or a drop in back pressure in the drilling pipe or other indications of potential inadvertent return occurrence.

- Pipeline construction personnel tasked with the observation of the directional drill path shall be dispatched to walk the alignment and visually monitor the area for inadvertent drilling fluid release and report back any findings.

If an inadvertent return is identified:

- All work stops, including the recycling of drilling mud/lubricant. The pressure of water above the pipe will keep excess mud from escaping through the fracture. Drilling operations will be suspended if the release poses a threat to human health and safety or the environment.

- Owner shall be notified of the findings and release location and in return will contact the appropriate concerned parties and regulatory agencies as necessary.

- Determine the location and extent of the inadvertent return. The host utility will document the size, impact and conditions of the release with notes and photographs.

- Immediately contain the inadvertent drilling fluid return to minimize further migration of drilling fluids/slurry mixture across the surrounding area by use of hay bales, sand bags, or silt fencing to surround and contain the drilling mud.

- Direction from the Environmental Inspector shall be followed for clean-up and mitigation requirements.

- Remove the drilling fluids and restore the site to pre-existing conditions. Clean-up work will be performed by hand if a vacuum truck cannot access the release area. The clean-up shall be to

the maximum extent possible. All waste and collected materials will be disposed of at an approved location or recycled to the return pit.

- The host utility shall document the conditions of the cleaned up area with photographs.

- If the release area is not accessible, Owner will consult with the landowner(s) regarding next appropriate action, including leaving the drilling mud in place to avoid potential damage from vehicles entering the area or safety concerns to personnel.

- Once excess drilling mud is removed, the area will be seeded and/or replanted using species similar to those in the adjacent area, or allowed to re-grow from existing vegetation at the direction of National Grid

Containment Materials

At a minimum, the following containment, response, and clean-up equipment will be available in sufficient quantities proximate to the HDD site, during all drilling operations at the time such crossing occurs:

- straw bales/hay bales and 2 stakes per bale (min.);
- weighted sediment logs, sand/gravel bags;
- silt fence;
- erosion control blankets;
- plastic sheeting;
- turbidity barriers;
- shovels, pails, drums;
- push brooms;
- squeegees;
- pumps with sufficient hoses;
- mud storage tanks; and
- vacuum truck on 24-hour call, with 1 hour response time.

Photographs of inadvertent drilling fluid return shall be taken to document the size, location and clean- up procedures of any inadvertent return occurrence.

  - If drilling mud congeals, take no other action that would potentially suspend sediments in the water column. Monitor the inadvertent return for at least 2 hours to determine if the drilling mud congeals. (Bentonite will usually harden, effectively sealing the inadvertent return location).

- If drilling mud does not congeal, erect isolation/containment environment (underwater boom and curtain).

- If the fracture becomes excessively large, a spill response team would be called in to contain and clean up excess drilling mud in the water. Phone numbers of spill response teams in the area will be on site.

- If the spill affects an area that is vegetated, the area will be seeded and/or replanted using species similar to those in the adjacent area or allowed to re-grow from existing vegetation at the direction of National Grid.

- Revegetated areas will be monitored to confirm revegetation is successful.

- After inadvertent return is stabilized and any required removal is completed, the host utility shall document post-cleanup conditions with photographs and prepare inadvertent return incident report describing time, place, actions taken to remediate the inadvertent return and measures implemented to prevent recurrence.

Response Close-Out

- Drilling mud will be cleaned up by hand using hand shovels, buckets and soft bristled brooms as possible without causing damage to existing vegetation. Fresh water washes will be employed if deemed beneficial and feasible.

- The recovered drilling fluid will either be recycled to the return pit or hauled to an approved facility for disposal. No recovered drilling fluids will be discharged into streams, storm drains or any other water source. Off-site disposal in other than commercially operated disposal locations is subject to compliance with all applicable survey, landowner permission, and mitigation requirements. These materials will not be disposed on or buried in agricultural lands without landowner permission. Other construction materials and wastes shall be recycled, or disposed of, as appropriate.

- All inadvertent return excavation and clean-up sites will be returned to pre-project contours using clean fill, as necessary.

- All containment measures (fiber rolls, straw bale, etc.) will be removed, unless otherwise specified by the host utility.

- Containment structures will be pumped out and the ground surface scraped to bare topsoil without causing undue loss of topsoil or ancillary damage to existing and adjacent vegetation. Bare soil will be seeded and stabilized with mulch or erosion blankets as

applicable. Material will be collected in containers for temporary storage prior to removal from the site.

Construction Re-start

For releases not requiring external notification, drilling may continue, if 100 percent containment is achieved through the use of a leak stopping compound or redirection of the bore and the clean-up crew remains at the inadvertent return location until directed by the host utility that the HDD operations have stabilized and release potential has subsided.

If the release poses a threat to human health and safety or the environment, drilling operations will not recommence until conditions have been adequately addressed. For releases requiring external notification to applicable agencies, construction activities will not restart without prior approval from Owner.

Prior to restart, National Grid shall evaluate the current drill profile (e.g., drill pressures, pump volume rates, drilling mud consistency) to identify means to prevent further inadvertent return events.

Crossing Alternatives

During construction of the HDD, should there be an inadvertent return, the measures in this plan will be employed to respond. If necessary, before determining HDD construction infeasible, alternate drill path profiles may be developed to modify approach in response to site specific drilling conditions or to avoid further inadvertent return conditions.