

# GAS MAIN EXTENSION

## NORTH PEMBROKE ROAD

## PEMBROKE, NEW HAMPSHIRE

**PREPARED FOR:**  
LIBERTY UTILITIES  
15 BUTTRICK ROAD  
LONDONDERRY, NEW HAMPSHIRE 03053

**PREPARED BY:**  
KEACH-NORDSTROM ASSOCIATES, INC.  
10 COMMERCE PARK NORTH, SUITE 3  
BEDFORD, NEW HAMPSHIRE 03110  
(603) 627-2881



**KNA** KEACH-NORDSTROM ASSOCIATES, INC.  
Civil Engineering Land Surveying Landscape Architecture  
10 Commerce Park North, Suite 3B, Bedford, NH 03110 Phone (603) 627-2881

APRIL 2, 2019  
PROJECT NO. 18-0910-1

### SHEET TITLE

GAS MAIN EXTENSION OVERVIEW PLAN  
GAS MAIN EXTENSION LAYOUT PLAN  
GAS MAIN EXTENSION PROFILE PLAN  
CONSTRUCTION DETAILS

### SHEET No.

1  
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6 - 7

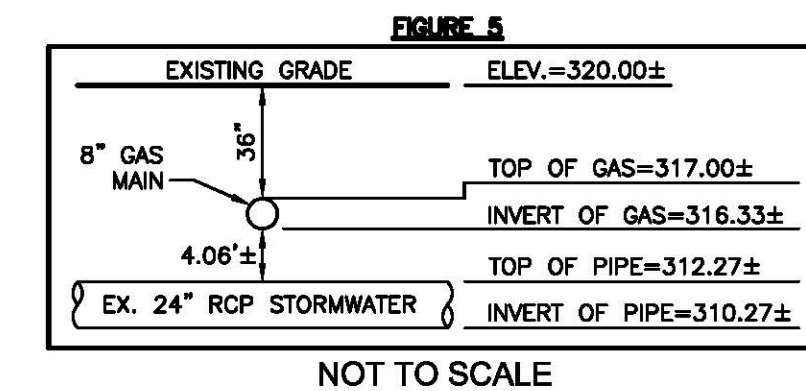
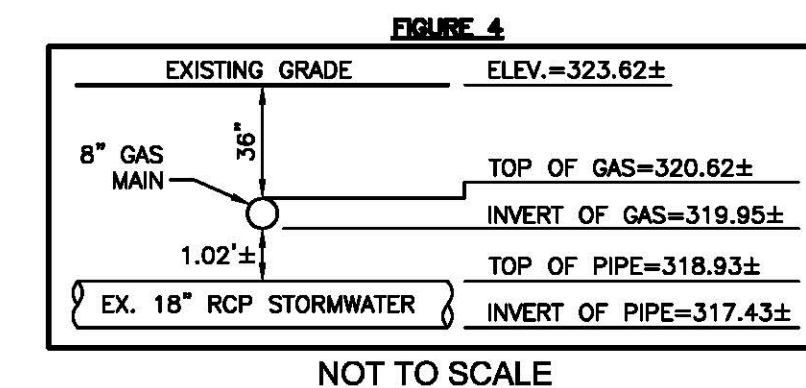
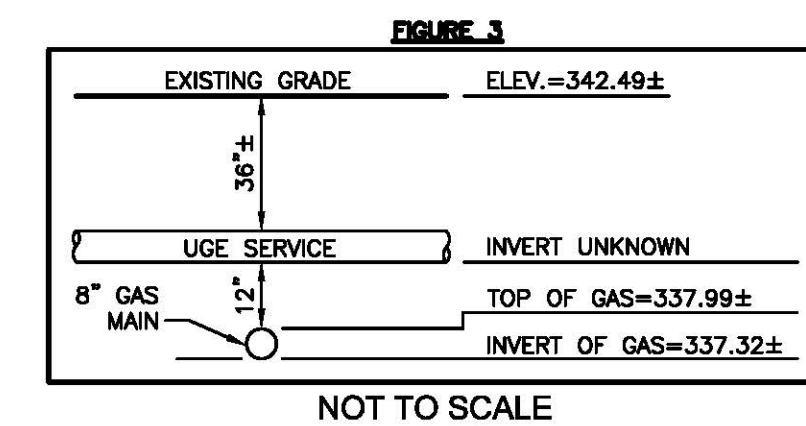
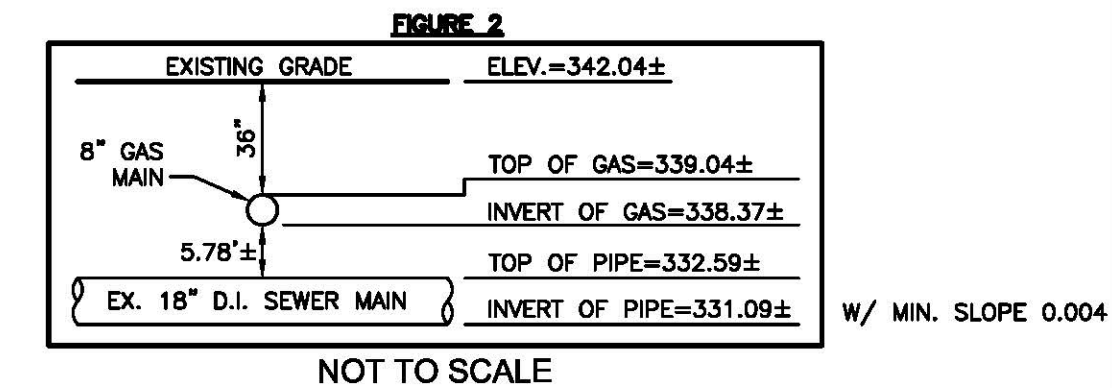
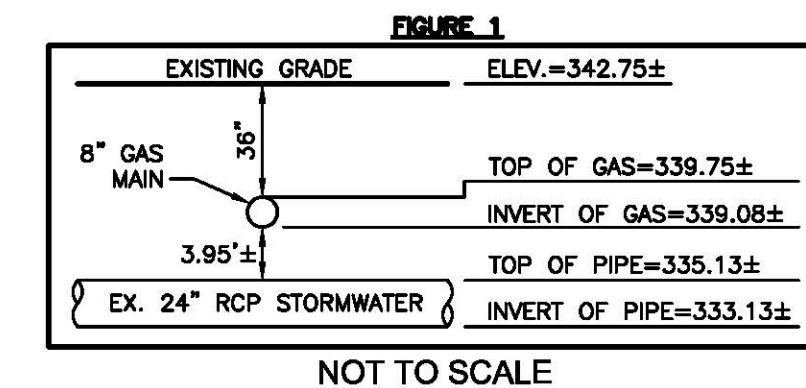
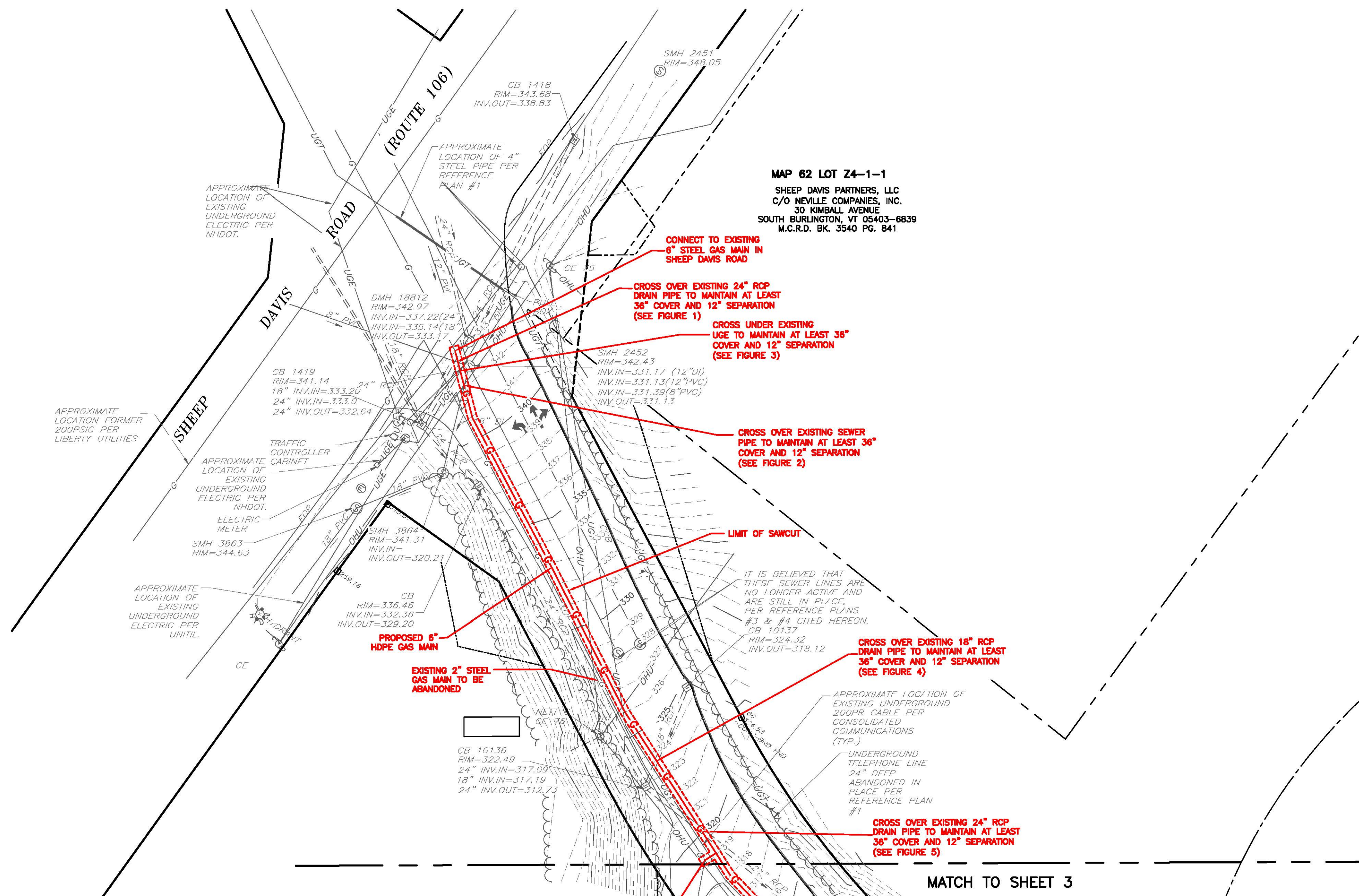






SEE SHEET 1 FOR NOTES

LOAM & SEED ALL DISTURBED  
AREAS THAT ARE BEYOND THE  
EDGE OF GRAVEL SHOULDER (TYP.)

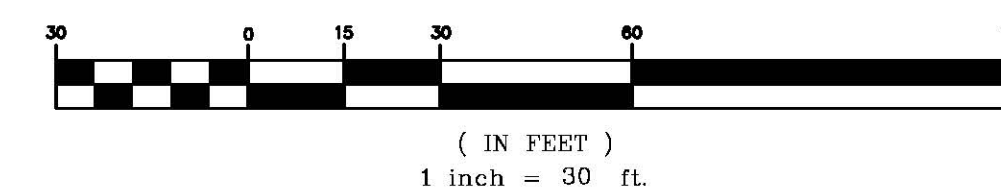


**LEGEND**

	CONCRETE BOUND FOUND		OVERHEAD UTILITIES
	NH HIGHWAY BOUND FOUND		GAS LINE
	IRON PIN FOUND		WATER LINE
	DRILL HOLE FOUND		SEWER LINE
	UTILITY POLE		DRAINAGE LINE
	SIGN		TREELINE
	MAILBOX		DOUBLE YELLOW LINE
	STREET LIGHT		SINGLE WHITE LINE
	LIGHT POST		EDGE OF PAVEMENT
	GAS VALVE		VERTICAL GRANITE CURB
	WATER VALVE		EDGE OF GRAVEL
	HYDRANT		10' CONTOUR
	WATER SHUT OFF		2' CONTOUR
	SEWER MANHOLE		STONEWALL
	DRAINAGE MANHOLE		PROPOSED GAS LINE
	CATCH BASIN		SAWCUT LINE
	SHRUB		LIMIT OF PROPOSED HORIZONTAL DIRECTIONAL DRILL
	TREES		TEMPORARY SILT FENCE
	ABUTTER LINE		
	RIGHT-OF-WAY LINE		
	POST & RAIL FENCE		



GRAPHIC SCALE



**GAS MAIN EXTENSION LAYOUT PLAN**  
**NORTH PEMBROKE ROAD**  
**GAS MAIN EXTENSION**  
**NORTH PEMBROKE ROAD**  
**PEMROKE, NEW HAMPSHIRE**  
**MERRIMACK COUNTY**

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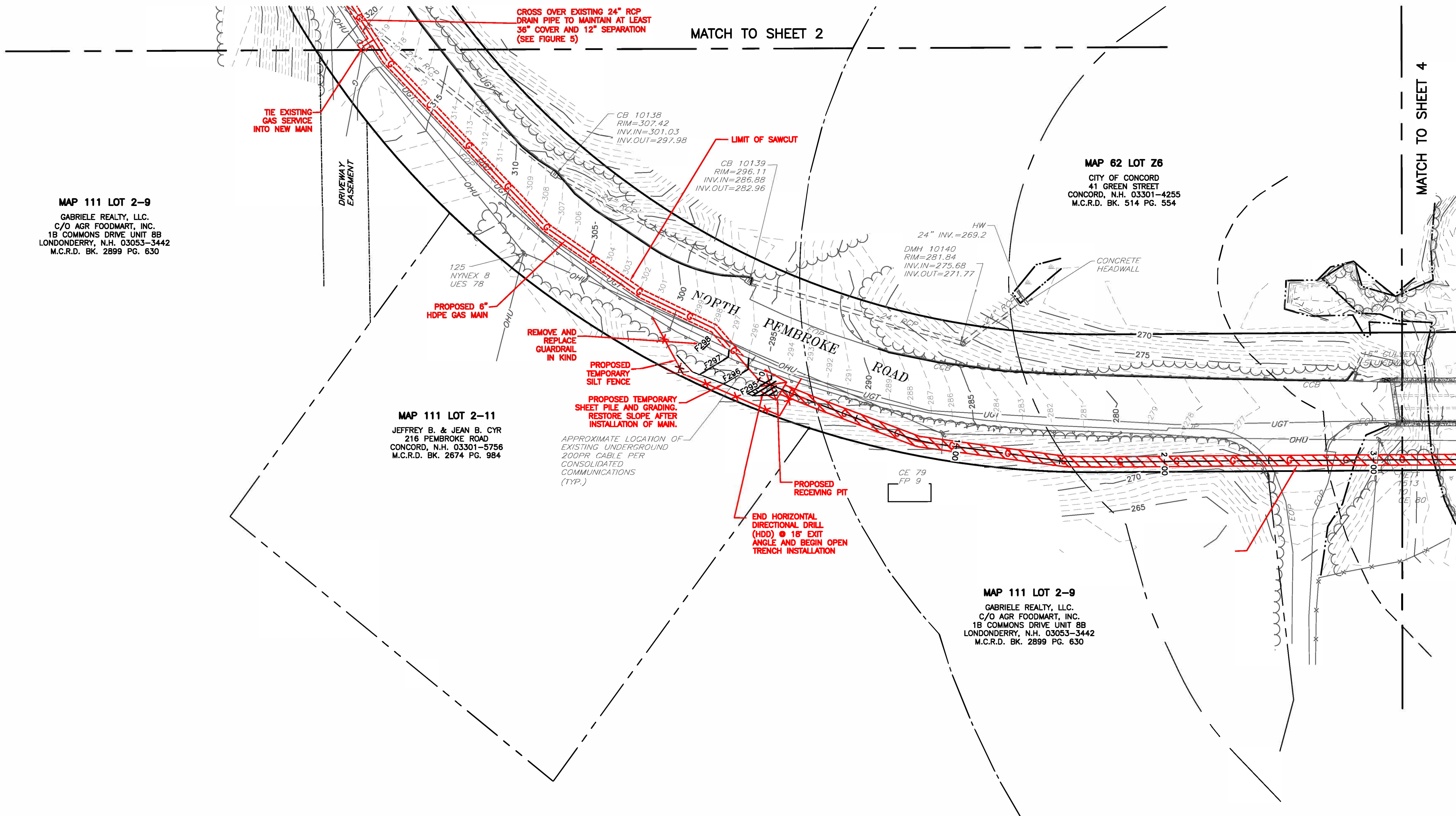
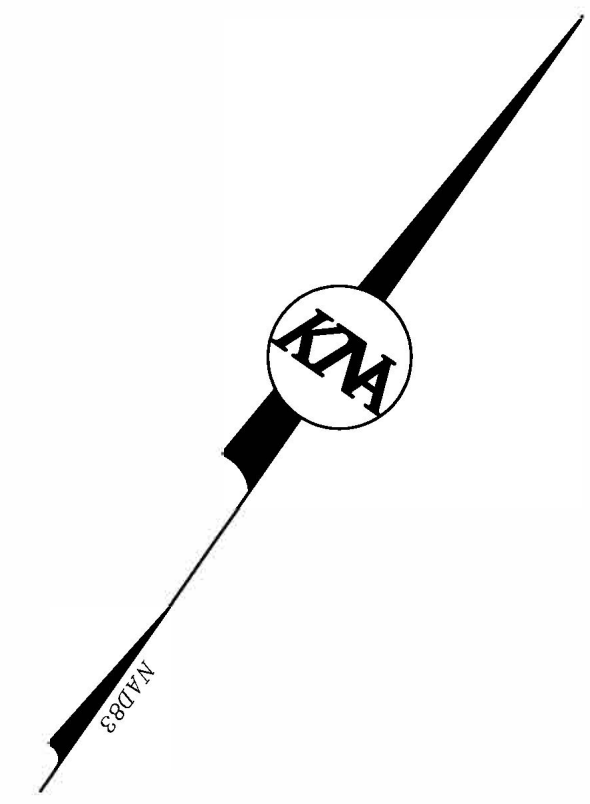
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PROJECT NO: 18-0910-1		SHEET 2 OF 7	

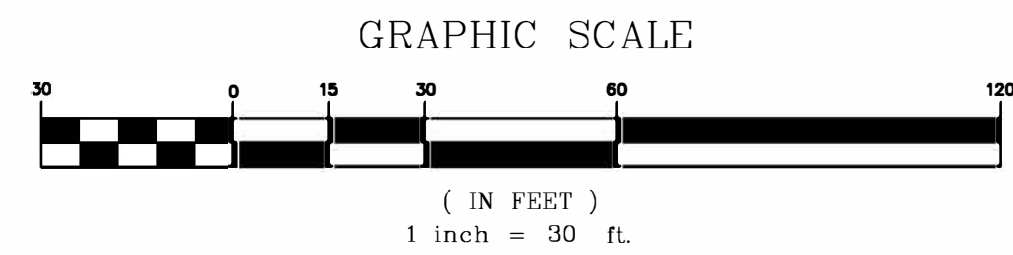


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LEGEND	
	CONCRETE BOUND FOUND
	NH HIGHWAY BOUND FOUND
	IRON PIN FOUND
	DRILL HOLE FOUND
	UTILITY POLE
	SIGN
	MAILBOX
	STREET LIGHT
	LIGHT POST
	GAS VALVE
	WATER VALVE
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	OVERHEAD UTILITIES
	GAS LINE
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	TREELINE
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	EDGE OF PAVEMENT
	VERTICAL GRANITE CURB
	EDGE OF GRAVEL
	10' CONTOUR
	2' CONTOUR
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	PROPOSED GAS LINE
	SAWCUT LINE
	LIMIT OF PROPOSED HORIZONTAL DIRECTIONAL DRILL
	TEMPORARY SILT FENCE



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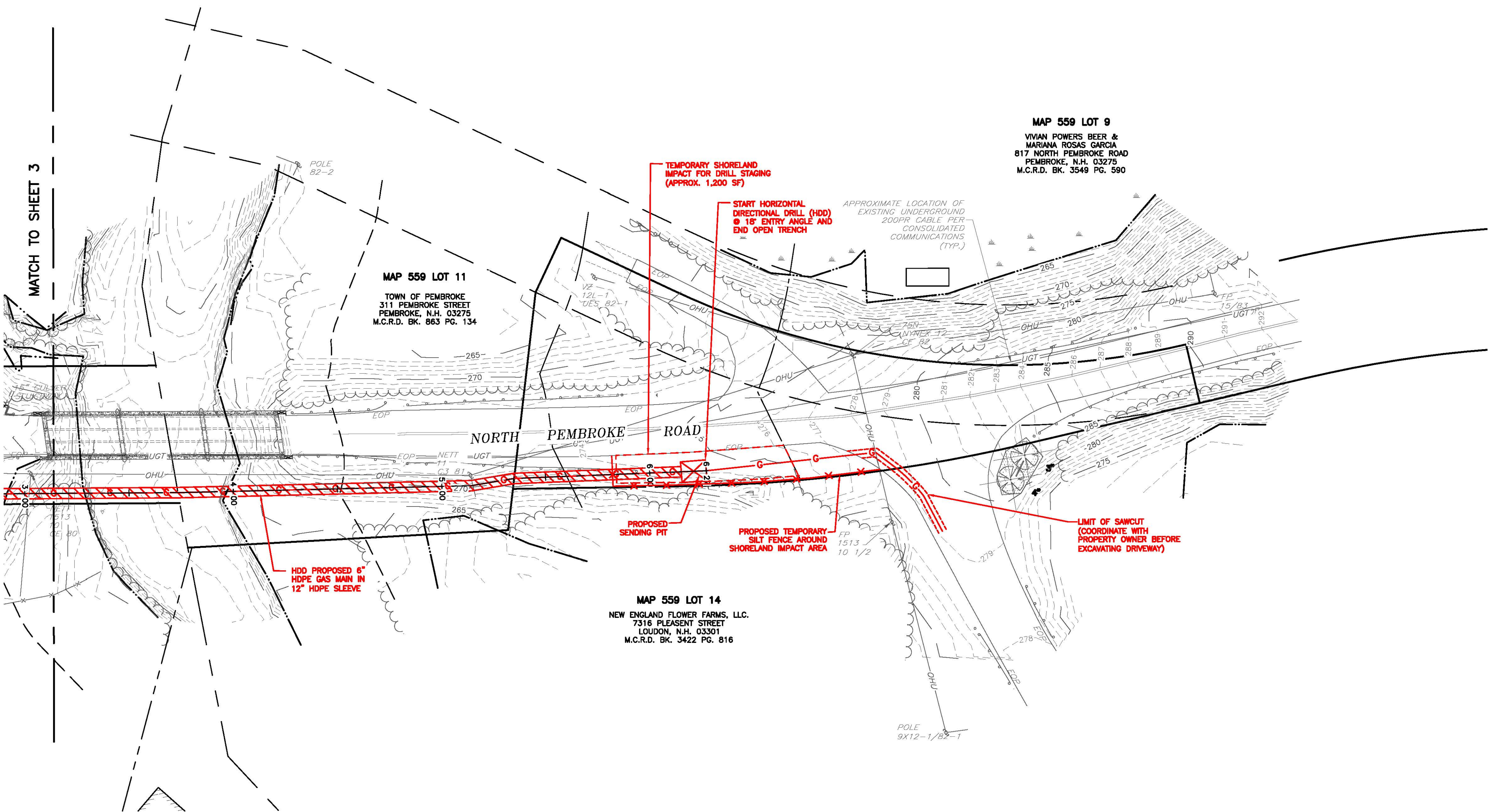
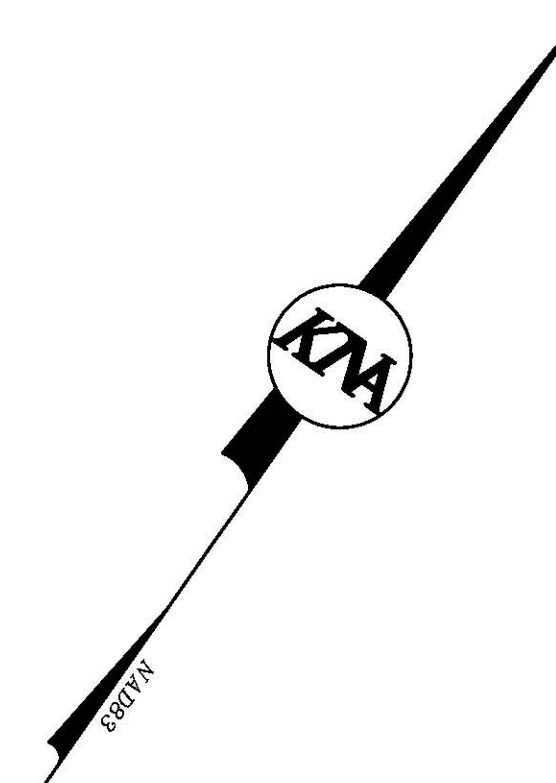
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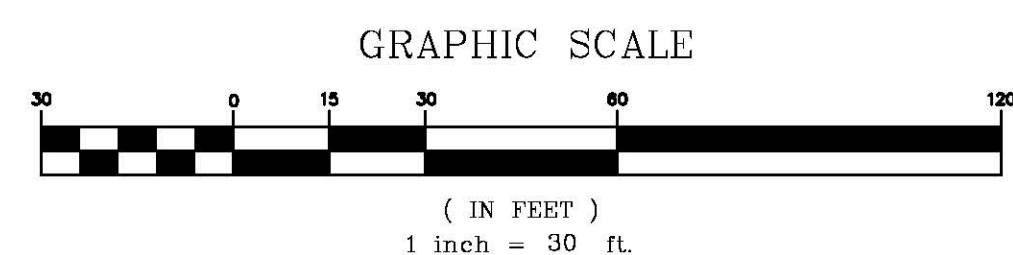
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LEGEND

- |          |                        |         |  |
|----------|------------------------|---------|--|
| ■ CMCB-F | CONCRETE BOUND FOUND   | — OHU — | OVERHEAD UTILITIES                             |
| ■ NHMB-F | NH HIGHWAY BOUND FOUND | — G —   | GAS LINE                                       |
| ● IP-F   | IRON PIN FOUND         | — W —   | WATER LINE                                     |
| ● DH-F   | DRILL HOLE FOUND       | — S —   | SEWER LINE                                     |
| ○        | UTILITY POLE           | — D —   | DRAINAGE LINE                                  |
| □        | SIGN                   | — DWL — | TREELINE                                       |
| ⊙        | MAILBOX                | — SWL — | DOUBLE YELLOW LINE                             |
| ⊙        | STREET LIGHT           | — EOP — | SINGLE WHITE LINE                              |
| ⊙        | LIGHT POST             | — VGC — | EDGE OF PAVEMENT                               |
| ⊙        | GAS VALVE              | —       | VERTICAL GRANITE CURB                          |
| ⊙        | WATER VALVE            | —       | EDGE OF GRAVEL                                 |
| ⊙        | HYDRANT                | —       | 10' CONTOUR                                    |
| ⊙        | WATER SHUT OFF         | —       | 2' CONTOUR                                     |
| ⊙        | SEWER MANHOLE          | —       | STONEWALL                                      |
| ⊙        | DRAINAGE MANHOLE       | —       | PROPOSED GAS LINE                              |
| ⊙        | CATCH BASIN            | —       | SAWCUT LINE                                    |
| ⊙        | SHRUB                  | —       | LIMIT OF PROPOSED HORIZONTAL DIRECTIONAL DRILL |
| ⊙        | TREES                  | —       | TEMPORARY SILT FENCE                           |
| ⊙        | ABUTTER LINE           | —       |  |
| ⊙        | RIGHT-OF-WAY LINE      | —       |  |
| ⊙        | POST & RAIL FENCE      | —       |  |



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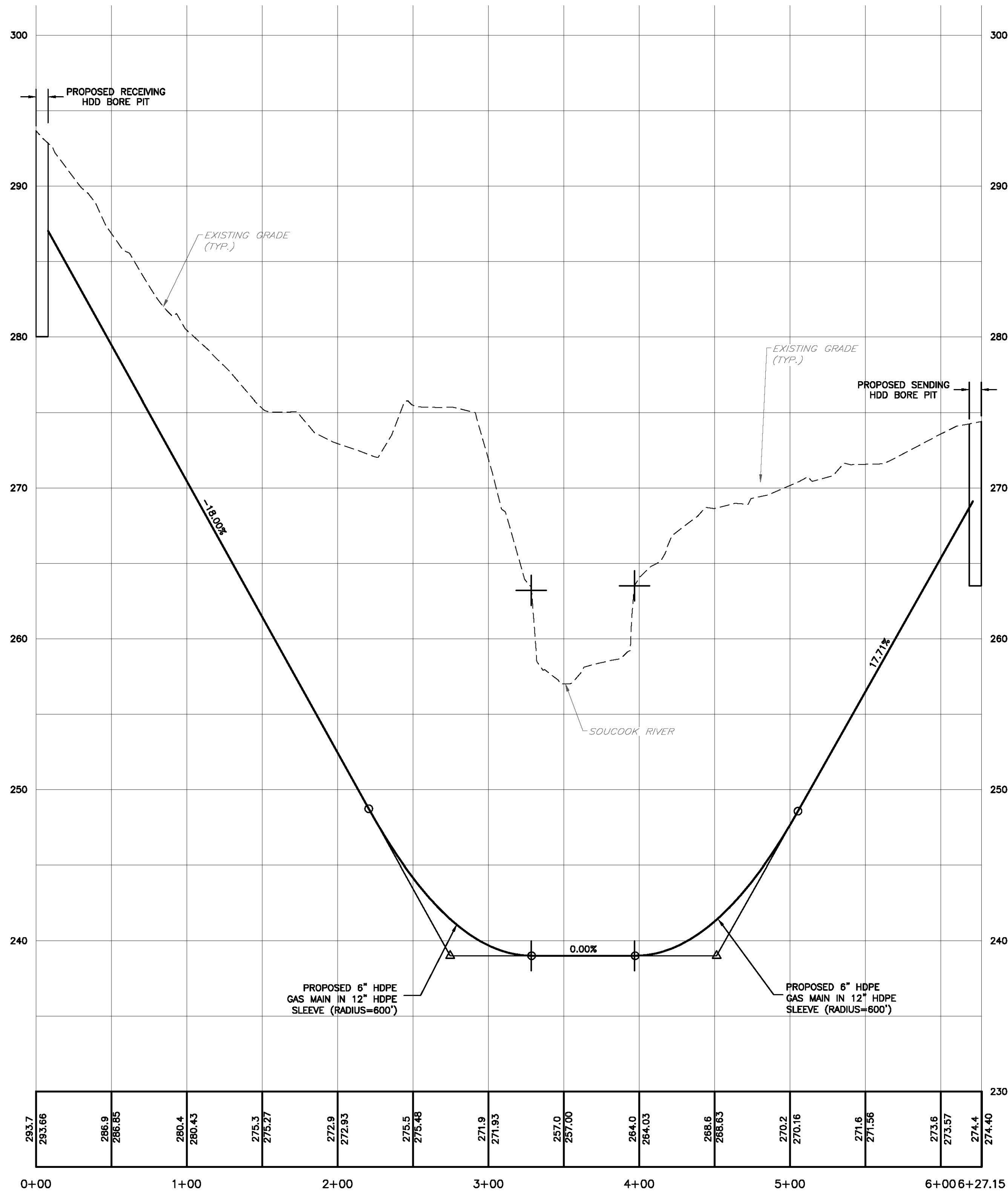
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LEGEND		
	CNCB-F	CONCRETE BOUND FOUND
	NHHB-F	NH HIGHWAY BOUND FOUND
	IP-F	IRON PIN FOUND
	DH-F	DRILL HOLE FOUND
		UTILITY POLE
		SIGN
		MAILBOX
		STREET LIGHT
		LIGHT POST
		GAS VALVE
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	OHU	OVERHEAD UTILITIES
	G	GAS LINE
	W	WATER LINE
	S	SEWER LINE
	D	DRAINAGE LINE
	DL	TREELINE
	DYL	DOUBLE YELLOW LINE
	SWL	SINGLE WHITE LINE
	EOP	EDGE OF PAVEMENT
	VGC	VERTICAL GRANITE CURB
		EDGE OF GRAVEL
		10' CONTOUR
		2' CONTOUR
	G	PROPOSED GAS LINE



PROPOSED GAS MAIN HDD PROFILE

SCALE: 1" = 50'(HORIZ.)

1" = 5'(VERT.)



GAS MAIN EXTENSION PROFILE PLAN

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GAS MAIN EXTENSION

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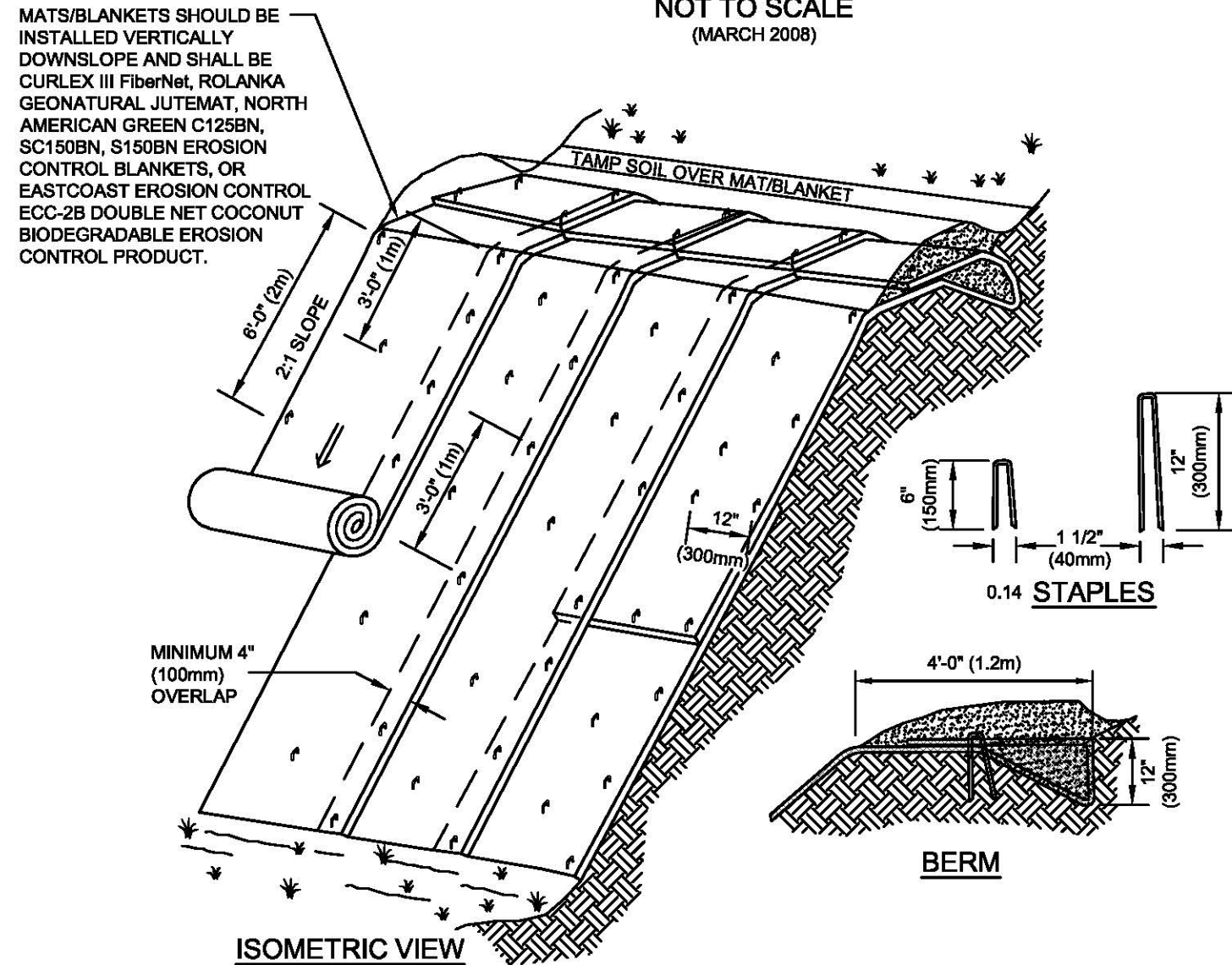
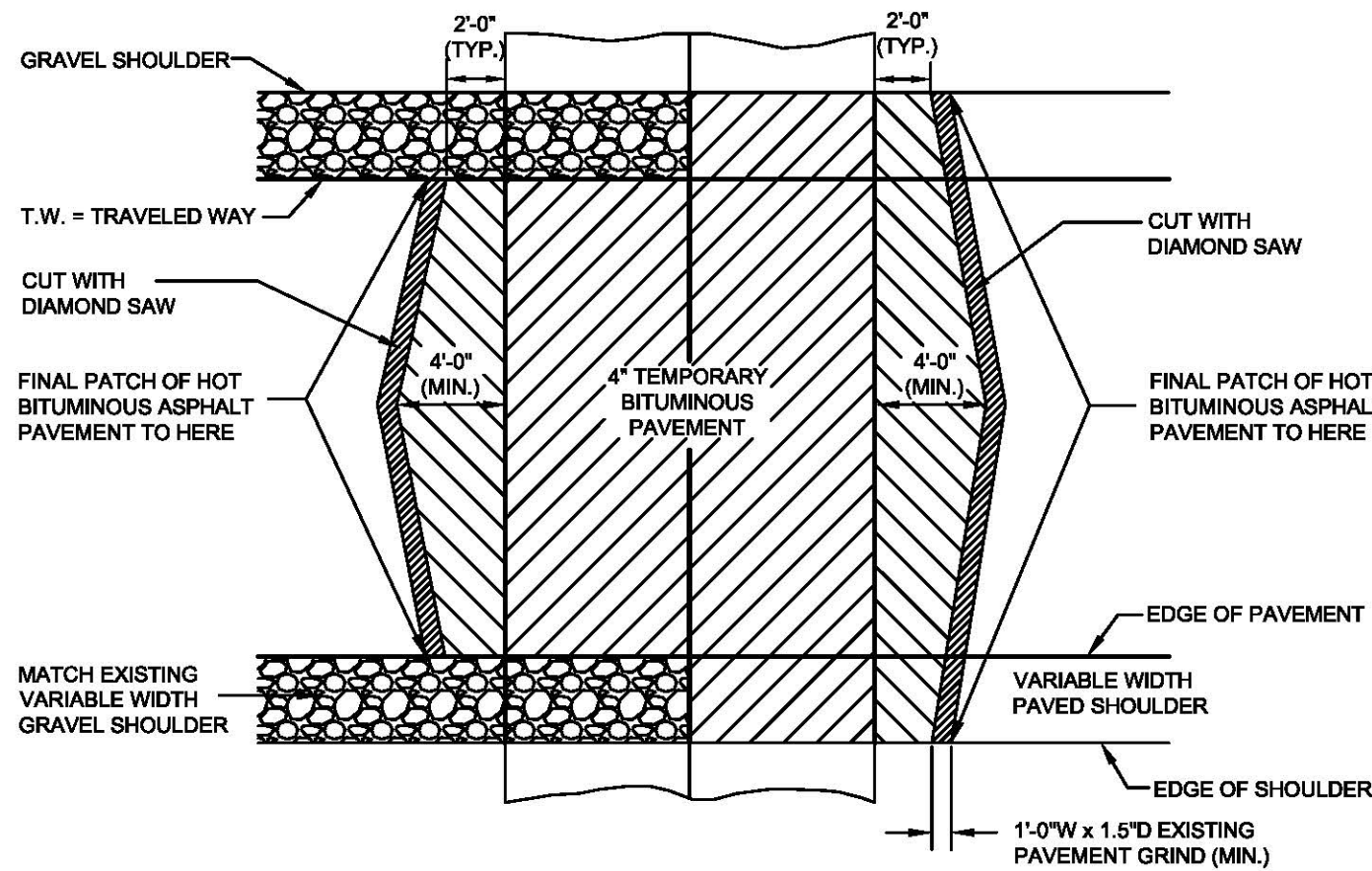
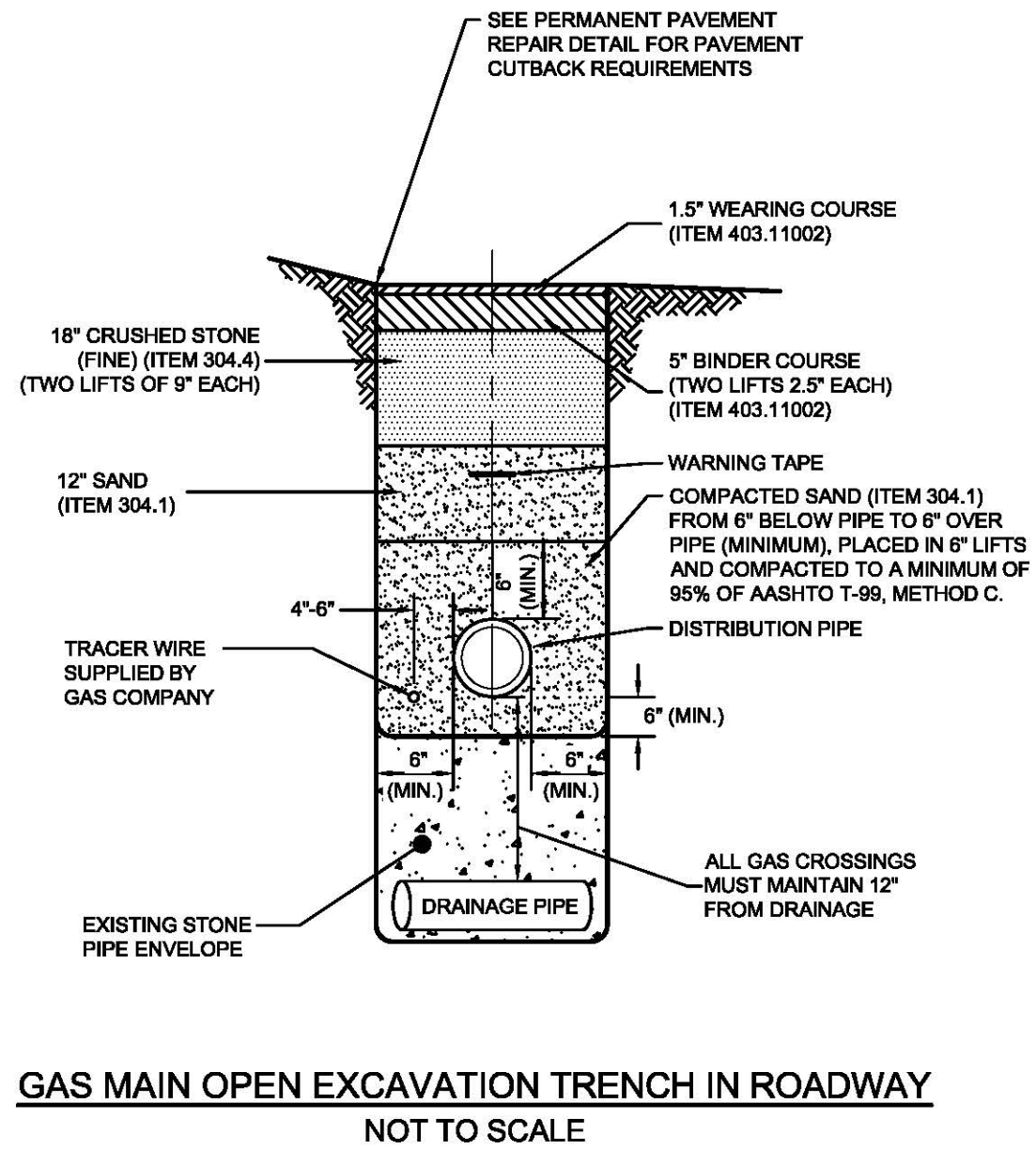
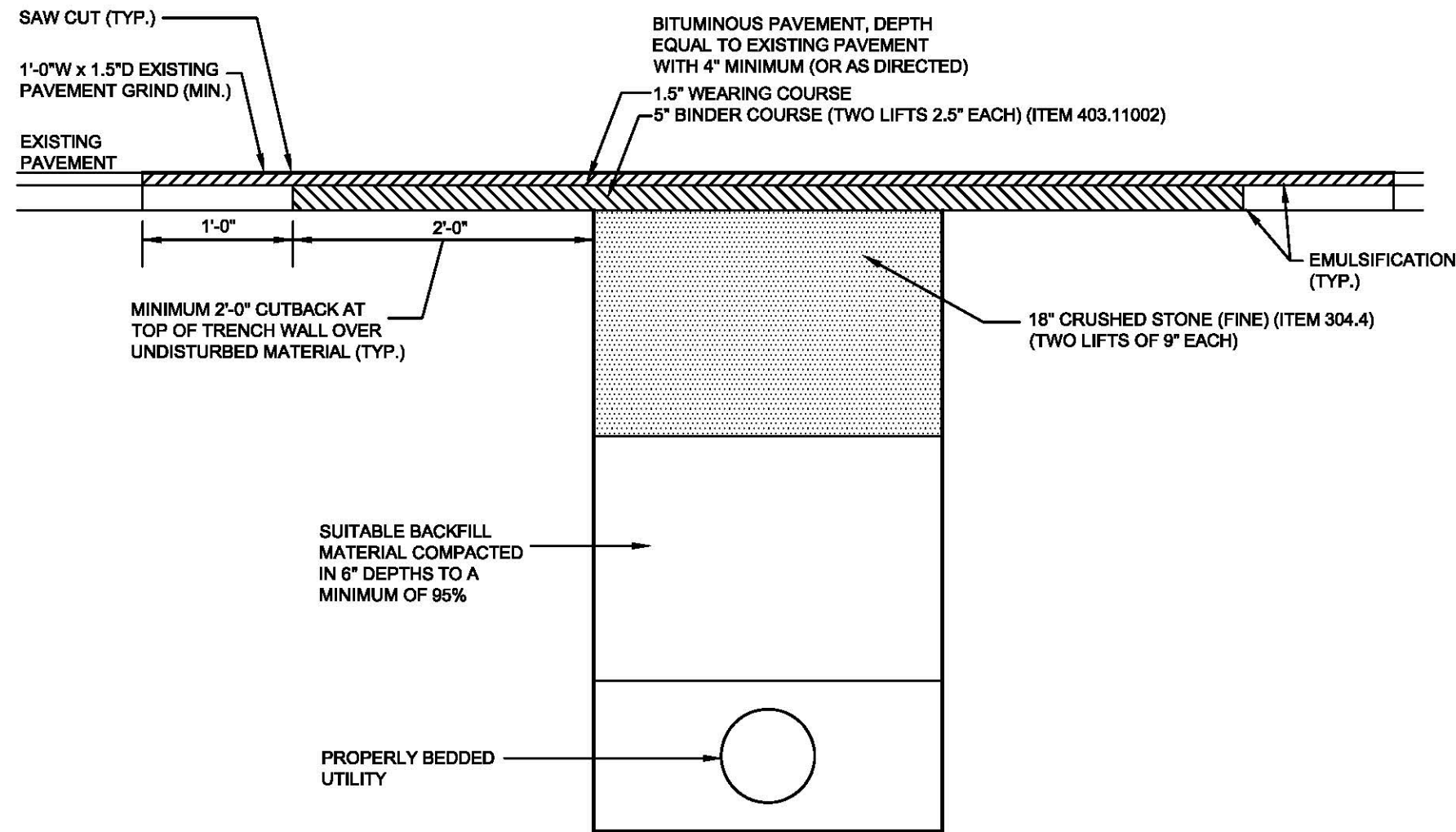
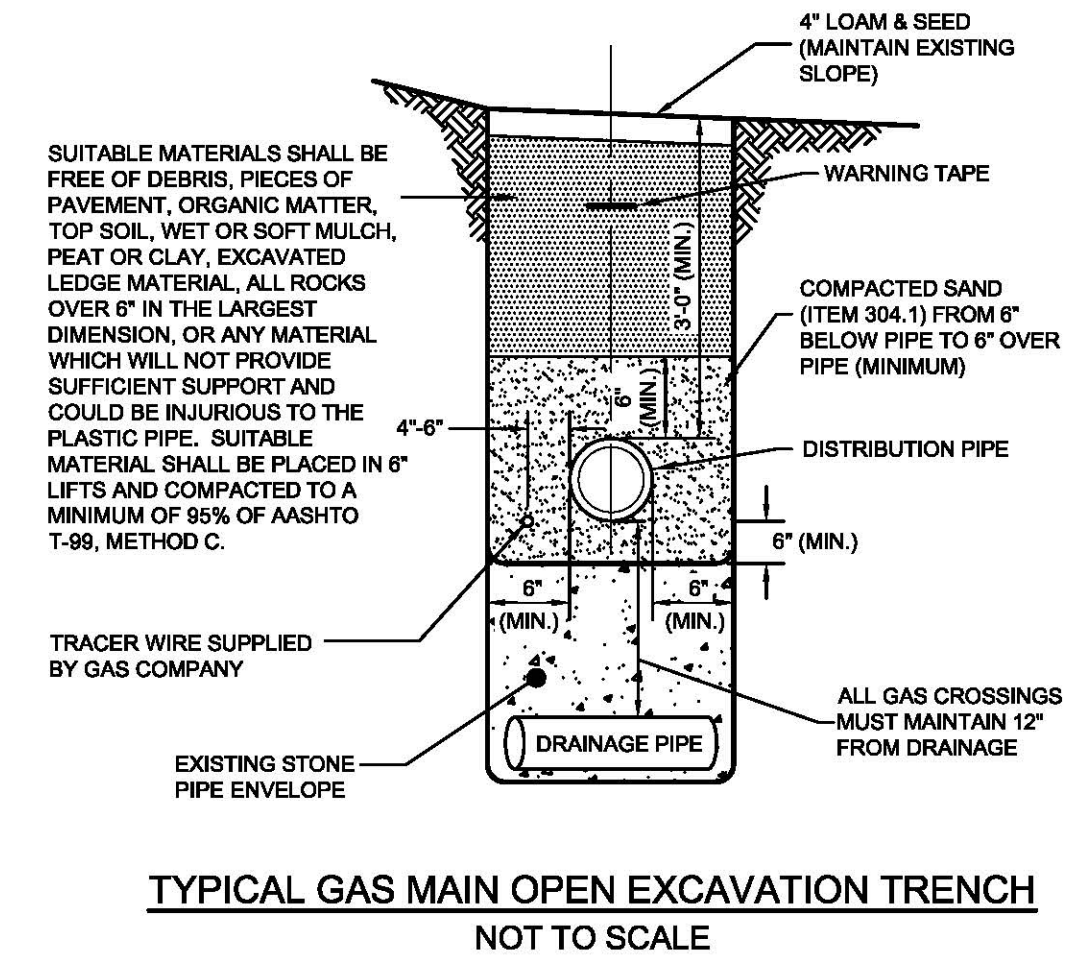
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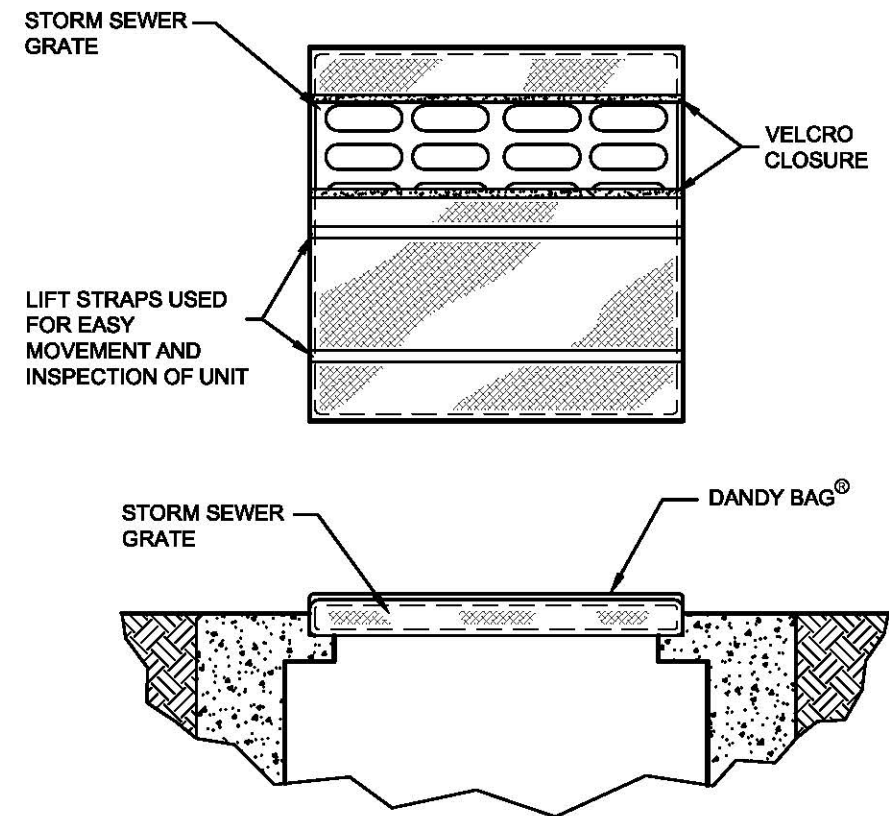
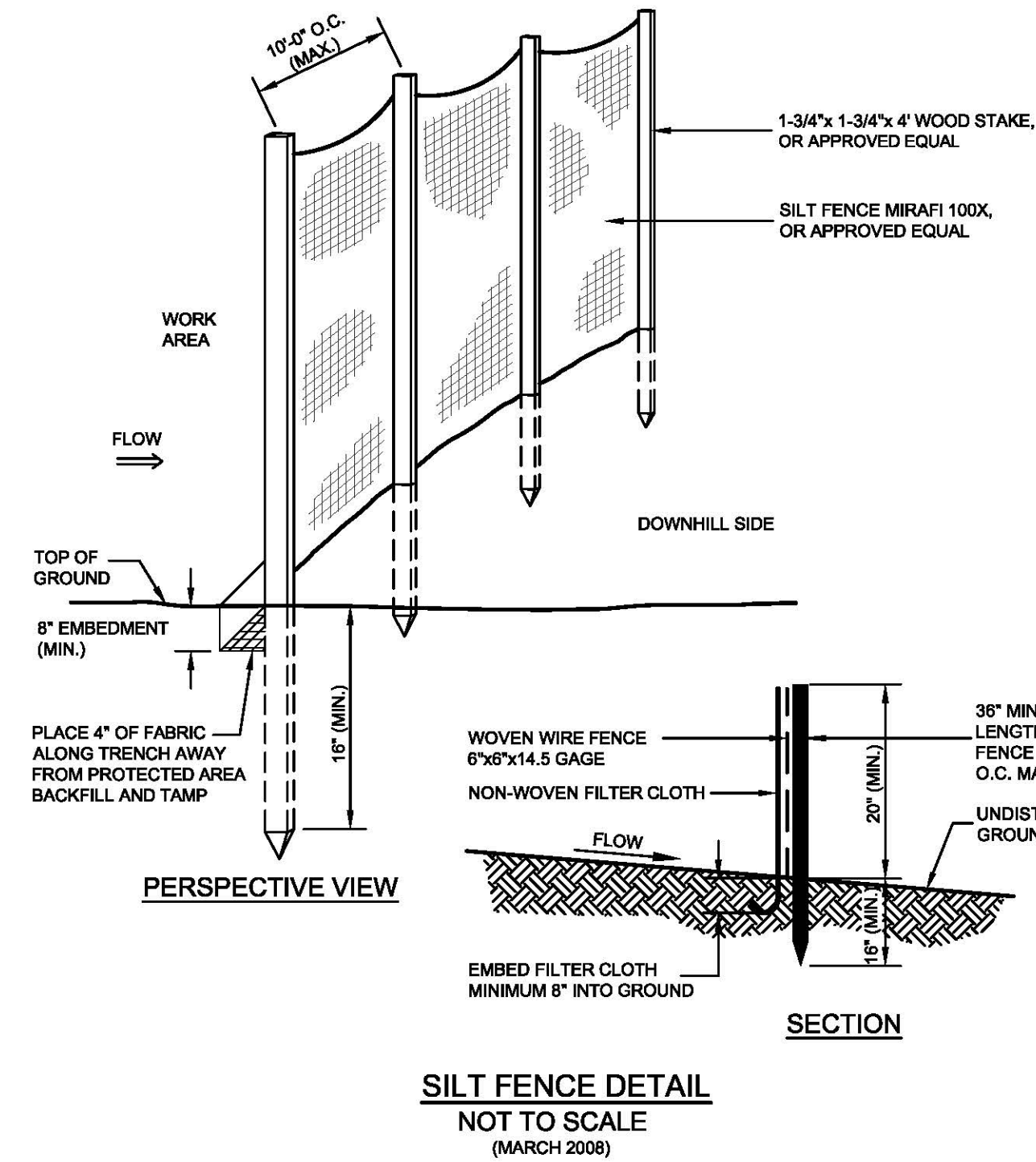
DATE: APRIL 2, 2018 SCALE: AS NOTED  
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- NOTES:**
1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLOUDS, STICKS AND GRASS. MATS/ BLANKETS SHALL HAVE GOOD SOIL CONTACT.
  2. APPLY PERMANENT SEEDING BEFORE PLACING BLANKETS.
  3. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.
  4. EROSION CONTROL BLANKETS WITH WELDED PLASTIC OR BIODEGRADABLE PLASTIC NETTING OR THREAD SHALL NOT BE USED.
  5. ACCEPTABLE EROSION CONTROL BLANKETS INCLUDE: CURLEX III FiberNet, ROLANKA GEONATURAL JUTEMAT, NORTH AMERICAN GREEN C125BN, SC150BN, S150BN EROSION CONTROL BLANKETS, OR EASTCOAST EROSION CONTROL ECC-2B DOUBLE NET COCONUT BIODEGRADABLE EROSION CONTROL PRODUCT.

**EROSION CONTROL BLANKETS - SLOPE INSTALLATION**  
NOT TO SCALE  
(AUGUST 2011)



**HI-FLOW DANDY BAG® (SAFETY ORANGE)**

MECHANICAL PROPERTIES	TEST METHOD	UNITS	MARV
GRAB TENSILE STRENGTH	ASTM D 4632	kN (lbs)	1.62 (365) x 0.89 (200)
GRAB TENSILE ELONGATION	ASTM D 4632	%	24 x 10
PUNCTURE STRENGTH	ASTM D 4833	kN (lbs)	0.40 (80)
MULLEN BURST STRENGTH	ASTM D 3786	kPa (psi)	3097 (450)
TRAPEZOID TEAR STRENGTH	ASTM D 4533	kN (lbs)	0.51 (115) x 0.33 (75)
UV RESISTANCE	ASTM D 4355	%	90
APPARENT OPENING SIZE	ASTM D 4751	Mm (US Std Sieve)	0.425 (40)
FLOW RATE	ASTM D 4491	1/min/m <sup>2</sup> (gal/min/ft <sup>2</sup> )	5907 (145)
PERMITTIVITY	ASTM D 4491	Sec <sup>-1</sup>	2.1

**DANDY BAG®**  
NOT TO SCALE  
(APRIL 2010)

**CONSTRUCTION SPECIFICATIONS:**

1. THE GEOTEXTILE FABRIC SHALL MEET THE DESIGN CRITERIA FOR SILT FENCES.
2. THE FABRIC SHALL BE EMBEDDED A MINIMUM OF 8 INCHES INTO THE GROUND AND THE SOIL COMPACTED OVER THE EMBEDDED FABRIC.
3. WOVEN WIRE FENCE SHALL BE FASTENED SECURELY TO THE FENCE POSTS WITH WIRE TIE OR STAPLES WHERE NOTED OR AS DIRECTED BY DESIGN ENGINEER.
4. FILTER CLOTH SHALL BE FASTENED SECURELY TO THE WOVEN WIRE FENCE WITH TIES SPACED EVERY 24 INCHES AT THE TOP, MIDSECTION AND BOTTOM.
5. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER, THEY SHALL BE OVERLAPPED BY 6 INCHES, FOLDED AND STAPLED.
6. FENCE POSTS SHALL BE A MINIMUM OF 36 INCHES LONG AND DRIVEN A MINIMUM OF 16 INCHES INTO THE GROUND. WOOD POSTS SHALL BE OF SOUND QUALITY HARDWOOD AND SHALL HAVE A MINIMUM CROSS SECTIONAL AREA OF 3.0 SQUARE INCHES.
7. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

**MAINTENANCE:**

1. SILT FENCES SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REPAIRS THAT ARE REQUIRED SHALL BE MADE IMMEDIATELY.
2. IF THE FABRIC ON A SILT FENCE SHOULD DECOMPOSE OR BECOME INEFFECTIVE DURING THE EXPECTED LIFE OF THE FENCE, THE FABRIC SHALL BE REPLACED PROMPTLY.
3. SEDIMENT DEPOSITS SHOULD BE INSPECTED AFTER EVERY STORM EVENT. THE DEPOSITS SHOULD BE REMOVED WHEN THEY REACH APPROXIMATELY ONE-HALF THE HEIGHT OF THE BARRIER.
4. SEDIMENT DEPOSITS THAT ARE REMOVED OR LEFT IN PLACE AFTER THE FABRIC HAS BEEN REMOVED SHALL BE GRADED TO CONFORM WITH THE EXISTING TOPOGRAPHY AND VEGETATED.

**CONSTRUCTION DETAILS**  
**NORTH PEMBROKE ROAD**  
**GAS MAIN EXTENSION**

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Traffic control is a vital public service.

**Functions of Flagging.**

Guide traffic safely through work areas.

Make every effort to give the traveling public the right of way.

Protect the lives of workers.

Avoid unreasonable delays to the traveling public or work crew.

Answer reasonable questions courteously and intelligently.

**Clothing and Equipment.**

Hard hat (orange or other bright color)

Safety vest

Hand paddle "Stop/Slow" at least 18" wide with 6" letters (keep spare handy)

Flashlight with 6" wand for night control

\*All gear used at night must be reflectorized. Flagging station should be illuminated.

- | DO'S   | DON'TS                           |
|--|----------------------------------|
| • Be alert.  | • Stand in open traffic lane     |
| • Wear equipment properly                            | • Turn your back on traffic      |
| • Stand clear, in good view                          | • Walk between vehicles          |
| • Know plans   | • Leave your position unattended |
| • Treat every driver as you would like to be treated |                                  |

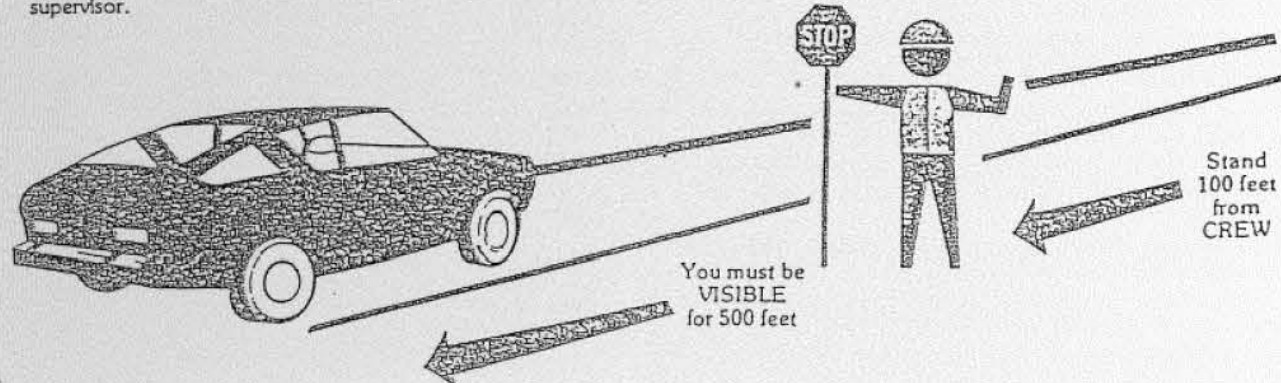
### STATION OR POSITION

The flagperson shall stand in a conspicuous position on the right edge of the traveled way FACING THE DIRECTION OF THE APPROACHING TRAFFIC. The position taken should be near enough to the workers being protected so that there is no doubt as to the flagperson's purpose, but not so close as to be mistaken for one of the workers. This position may vary up to 500 feet depending upon sight distances, etc.

In urban areas the distance from the flagperson to the worksite can be reduced. Special care must be taken to avoid long traffic delays that may "clog up" the local street system.

At a "spot" work site it may be necessary to stand on the shoulder of the left hand lane or opposite the work site in order to effectively control the traffic. Flagging positions must be adequately covered by proper advance warning signs and night time stations must have adequate illumination.

A flagperson should not leave the flagging station to pick up or replace signs or barricades. This is the responsibility of the supervisor.



**NHDOT DAYTIME TRAFFIC CONTROL PROCEDURE**  
NOT TO SCALE

### Traffic control procedures with paddles

- To stop traffic
  - Face the traffic
  - Extend the paddle in a vertical position so the "STOP" side is visible to oncoming driver
  - Make eye contact with driver
  - Raise and expose palm of free hand to indicate vehicle is required to stop
- To alert and slow traffic
  - Extend the sign paddle vertically with the "STOP" side visible to driver
  - Before vehicle comes to a complete stop, turn paddle to show "SLOW" side
  - For emphasis the free hand may be raised and lowered with the palm down
- To release traffic
  - Step to side of road
  - Show "SLOW" side of paddle
  - With free hand, motion traffic to proceed

### Traffic Control With Flags

#### EMERGENCY USE ONLY

- To stop traffic
  - Face traffic and extend flag horizontally across the traffic lane in stationary position. Raise free hand, palm up, toward traffic.
- To alert or slow traffic
  - Face traffic and slowly wave flag in a sweeping motion of the extended arm from shoulder level to straight down, without raising the arm above the horizontal position.
- To release traffic
  - Stand on side of road with flag and arm lowered to your side. Motion traffic ahead with free hand.

FLAGS SHALL NOT BE USED TO SIGNAL TRAFFIC TO PROCEED.

New Hampshire Department of Transportation

### REMEMBER

THE FLAGPERSON SHOULD BE VISIBLE AT ALL TIMES

NEVER STAND IN AN OPEN TRAFFIC LANE

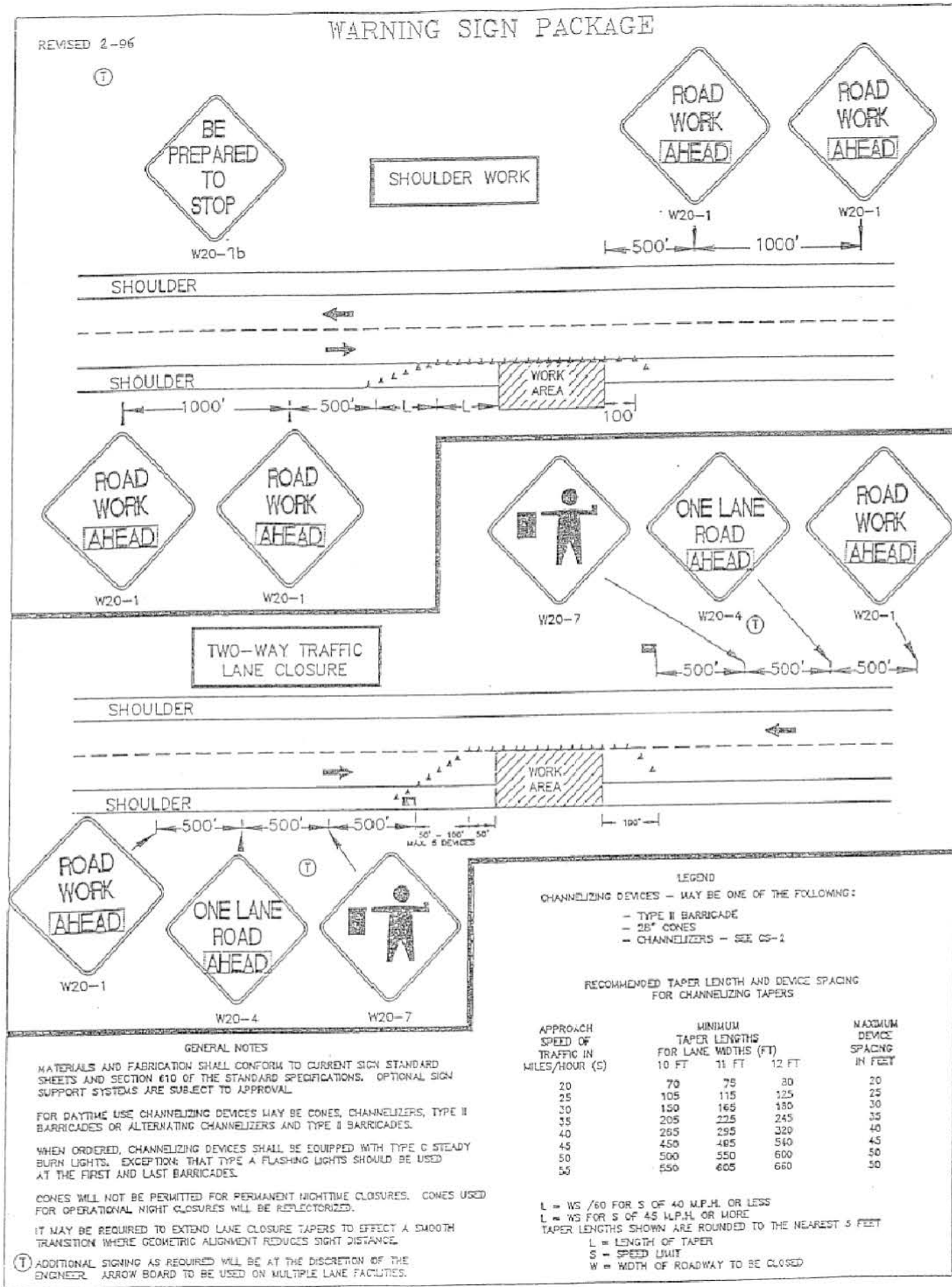
STAND ALONE AND DON'T PERMIT WORKERS TO GATHER AROUND YOU

DO NOT STAND NEAR EQUIPMENT

DO NOT WATCH THE OPERATIONS

NEVER TURN YOUR BACK TO THE TRAFFIC

Your job is to provide the motorist with guidance. You will lose their respect and add to their confusion by turning your back to them.



**NHDOT WARNING SIGN PACKAGE DETAIL**  
NOT TO SCALE

## CONSTRUCTION DETAILS

### NORTH PEMBROKE ROAD GAS MAIN EXTENSION

NORTH PEMBROKE ROAD  
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