

Addendum No. 3 to IFB 16-48



CITY OF SOMERVILLE, MASSACHUSETTS
Department of Purchasing
JOSEPH A. CURTATONE
MAYOR

To: All Parties on Record with the City of Somerville as Holding **IFB 16-48**
Cedar St Sewer Separation

From: Alex Nosnik, Assistant Director, Purchasing

Date: January 28, 2016

Re: Extended Due Date, Revised Unit Price Form, Updated Specifications, Select, Revised Drawings/Plans

Addendum No. 3 to IFB 16-48

Please acknowledge receipt of this Addendum by signing below and including this form in your sealed bid package. Failure to do so may subject the proposer to disqualification.

X

Name of Authorized Signatory
Title of Authorized Signatory

Extension of Due Date: Bids are now due on 2/05/16 at 11 am.

The addendum makes the following changes:

1. Extends the due date of the IFB to Friday 2/05/16 at 11am EST.
2. Provides answers to bid questions (below).
3. Provides a revised Unit Price Form (***ALL BIDDERS ARE REQUIRED TO USE THIS REVISED FORM; Attachment 1***)
4. Provides revisions to Specifications Section 02000, ROADWAY SPECIAL PROVISIONS, have been made (***Attachment 2***).
5. The existing utilities layer on Sheets S-1 to S-10 was darkened (***Attachment 3***).
6. Revisions to the water main plan (Sheet S-10) have been made (***Attachment 3***).
7. Revisions to the Roadway Construction Plan and Profile, Sheets C-2 and C-3, have

Addendum No. 3 to IFB 16-48

- been made (**Attachment 3**).
8. The Elm Street and Summer Street Permanent Trench Pavement Replacement Detail was added to the construction details on Sheet D-1 (**Attachment 3**).
 9. A detail of the cross section of the existing sewer/combined sewer on Cedar Street was added to the construction details on Sheet D-4 (**Attachment 3**).
 10. Quantities for Road Reconstruction Items: 120.1, 129., 402., 450.21, 451., 701.1 and Utility Items 7b, 7c, and 8a were updated in the Unit Price Form (Section 00315) (**Attachment 1**).

BID QUESTIONS & ANSWERS

Q: It is noted that there is a need for manhole rehabilitation required by cementitious means. Please advise.

A: *Manholes to be rehabilitated with cementitious liner are indicated on the construction plans on Sheets S-2, S-3, and S-8. See Specifications Section 02439, Cementitious Lining of Manholes.*

Q: Is there a need for a material which will provide structural rehabilitation of the 42VF of manholes; what material of construction are the existing manholes; are the manholes 48" diameter or other?

A: *The cementitious lining materials are described in Specification Section 02439, Cementitious Lining of Manholes. The manholes to be lined are approximately 4-ft diameter brick manholes.*

Q: Is there a wet well separate from the manhole rehabilitation?

A: *There is not a separate wet well.*

Q: Is bypassing required and if so on what scale, i.e. size of lines and gpd?

A: *The Contractor shall divert flows as required to perform the work in accordance with the requirements specified in Specifications Section, 01575, HANDLING EXISTING FLOWS.*

Q: Item 120.1-Unclassified Excavation-2,610 Cubic Yards. How is this quantity derived? Based on Measurement & Payment, only the sidewalks qualify for payment under this item as the road.

A: *The quantity associated with the roadway excavation for this item was derived from taking the difference in the excavation required for the roadway less the 8" of reclamation section. The number was originally figured for full depth reconstruction with a deeper total section. The revised roadway quantity for this item includes the entire pavement and reclaimed section (14") indicated in the pavement notes less the 8" of reclamation. The revised quantity, including additional roadway excavation, sidewalk and driveway quantities is 2150 CY.*

Q: Item 402-Dense Graded-310 Cubic Yards- Where is this item to be used as the Reclaim Method is being used and the details do not indicate any dense grade material.

Addendum No. 3 to IFB 16-48

A: The Dense Graded Crushed Stone was included as a contingency item but overstated at 310 CY. The revised item quantity will be 100 CY.

Q: Item 450.21-HMA Top Course-The quantity does not correlate to the square yards of Reclaim and Milling quantities at 2 ½”.

A: The depth of HMA Top Course associated with the reclamation and milling is 2” as indicated in the pavement notes and correlates with the quantity.

Q: Drawing D-1 temporary pavement/trench detail shows 2-½” of temporary pavement but the paving notes on the sheet states 1” temporary pavement. Please clarify.

A: The Pavement Notes have been updated to show 2-1/2” of “Temporary Hot Mix Asphalt Patch for Trench”

Q: There are no details for the trench paving/restoration of Elm Street; please clarify.

A: The Elm Street Permanent Trench Pavement Replacement Detail was added to the construction details on Sheet D-1. The revised plans are attached herein (Attachment 3).

Q: Item 7c-12” DIP Water Main-2,493 Feet. The only 12’ water main is shown on Drawing S-10, therefore the estimated quantity is incorrect as the stationing is 10+50-27+25 and a 12” connection on Summer Street. Please clarify.

A: There is one (1) proposed 12-inch water main between STA 10+30 and STA 27+25, one (1) proposed 12-inch water main between STA 20+40 and 27+25, and 12-inch connection on Summer Street.

Q: The trench detail was not included in the spec.

A: The trench details are included on Sheet D-4 and D-5.

Q: Are police details paid by the contractor or by the City.

A: All police details will be paid for by the City.

Q: Will the contractor pay any permitting fees?

A: The City of Somerville will waive permit application fees.

Q: Can the City provide a single CAD layer of the existing utilizes?

A: The existing utilities layer was darkened and the revised plans are available for download on the City of Somerville’s Purchasing Department’s website.

Q: Is the rodent going to be constant throughout the project?

A: Rodent Control will be continuously required throughout the duration of the project.

Q: The construction detail for sidewalks indicates 4” of concrete and 6” of concrete at driveways. I do not see a payment item for 6” concrete driveways?

A: Item 701.1, Cement Concrete Sidewalk at Driveways has been added to the contract in the amount of 1000 SY.

Addendum No. 3 to IFB 16-48

Q: In section 00430-5.17 Project Photographs there is reference to “See Section 01320-Construction Progress Documentation”. Is 01320 going to be issued in an addendum?

A: *This section pertains to the City’s general terms and conditions in its sample construction contract. If applicable to this project, 01320 will be provided post award.*

Q: Section 00300-3 states the contractor will be charged for water but section 01140 states there will be no charge. Please clarify.

A: *In Accordance with Specifications Section 01140, there will be no charge for water use.*

Q: Section 01014, Sequence of Work, states that all work is to be complete in one phase before any work will be permitted in the next phase. Does this also include the water main work, as that will require temporary water bypass to remain longer than what seems necessary?

A: *The construction phasing described in Section 01014 and on the plans Sheet T-8 includes will be in effect for all utility work. The contractor may install temporary water bypass in more than one zone, however, work crews installing the proposed water main and water service connections can only be in one zone at a time. The intent of the construction phasing is to maintain resident access and parking, provide emergency vehicle access, and provide access to the Kennedy School.*

Q: Drawing C-5 shows saw cutting to the Limits of Work of Highland Ave., but there are no notes showing what work is required. Please clarify.

A: *The intersection at Highland Avenue shall be milled and resurfaced. This work is shown on the revised Sheet C-4 included herein (Attachment 3).*

Q: Bid Item 859.1 calls for epoxy paint, but we’ve been told this would create a slipping hazard when wet. Is the real intent to use epoxy?

A: *The City’s standard is to use epoxy paint for bike lanes.*

Q: Can arrangement be made with the City to utilize the land at the old waste transfer facility site next to the McGrath & O’Brien Highway for a staging area?

A: *At this time, a construction project is slotted to break ground at the former waste transfer facility around the same time that Cedar St. will break ground, so it will not be available as a staging area.*

Addendum No. 3 to IFB 16-48

Attachment 1
Revised Unit Price Bid Form

Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
ROADWAY RECONSTRUCTION ITEMS			
102.51	13 EA	Individual tree protection	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
102.52	2 EA	Remove & reset tree	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
103.	12 EA	Tree removed - diameter under 24 inches	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

*Quantity assumed for comparison of bids.

**The unit price in Item 13a is the minimum allowed for rock excavation and disposal. The bidder may add to the minimum in Item 13b.

Item No.	Estimated Quantity*	Bid Description Unit or Lump Sum Price Bid in Both Words and Figures	Total in Figure
104.	4 EA	Tree removed - diameter 24 inches and over	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
120.1	2,150 CY	Unclassified excavation	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
129.	2,060 SY	Pavement milling	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
151.	2,320 CY	Gravel borrow	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

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Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
153.	190 CY	Controlled density fill - Excavatable	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
170.	8,350 SY	Fine grading and compacting	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
402.	100 CY	Dense graded crushed stone for sub-base	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
403.	5,600 SY	Reclaimed pavement for base course and/or sub-base	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

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Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
403.1	420 TON	Crushed stone for blending	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
420.	1,250 TON	HMA base course	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
440.	5,600 LBS	Calcium chloride for roadway dust control	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
443.	20 MGL	Water for roadway dust control	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

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Item No.	Estimated Quantity*	Bid Description Unit or Lump Sum Price Bid in Both Words and Figures	Total in Figure
450.21	875 TON	HMA surface course - modified top	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
451.	1,440 TON	HMA for patching	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
452.	610 GAL	Asphalt emulsion for tack coat	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
464.5	3,800 FT	Hot poured rubberized asphalt sealer	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

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Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
472.	83 TON	Hot mix asphalt for miscellaneous work	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
482.3	650 FT	Sawing asphalt pavement	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
482.4	110 FT	Sawing concrete pavement	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
504.	100 FT	Granite curbType VA3 - straight	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

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Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
504.1	3 FT	Granite curb Type VA3 - curved	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
509.	830 FT	Granite transition curb for wheelchair ramps - straight	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
509.1	230 FT	Granite transition curb fror wheelchair ramps - curved	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
514.	14 EA	Granite curb inlet - straight	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

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Item No.	Estimated Quantity*	Bid Description Unit or Lump Sum Price Bid in Both Words and Figures	Total in Figure
580.	2,010 FT	Curb removed and reset	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
670.	49 FT	Fence removed and reset	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
697.1	64 EA	Silt sack	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
701.	1,310 SY	Cement concrete sidewalk	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

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Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
701.1	1,000 SY	Cement Concrete Sidewalk at Driveways	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
701.2	240 SY	Cement concrete sidewalk wheelchair ramps	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
703.	70 TON	Hot mix asphalt driveway	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
705.1	2 SY	Flagstone walk removed and reset	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

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Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
715.1	1 EA	Mailbox removed and reset	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
751.	2 CY	Loam borrow	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
765.	15 SY	Seeding	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
776.	5 EA	Karpick Red Maple	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

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Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
804.3	250 FT	3-inch electrical conduit Type NM - Plastic (UL)	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
813.81	1 EA	Service connection (underground)	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
815.1	1 LS	Traffic control signal - Summer Street	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
816.80	1 LS	Traffic control signal removed & stacked	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

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Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
832.	35 SF	Warning-regulatory and route marker - alum. Panel (Type A)	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
847.1	5 EA	Sign support and route marker w/breakaway post assembly - steel	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
851.1	340 DAY	Traffic cones for traffic management	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
852.	150 SF	Safety signing for traffic management	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

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Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
853.1	2 EA	Portable breakaway barricade - Type III	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
854.016	2,000 FT	Temporary paving markings - 6-inch (painted)	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
856.	340 DAY	Arrow board	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
856.12	140 DAY	Portable changeable message sign	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

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Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
859.	3,400 DRUM-	Reflectorized drum	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
864.041	120 SF	Pavement arrows and legends reflectorized white (epoxy)	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
868.04	1,950 FT	4 inch reflectorized white line (epoxy)	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
868.06	3,170 FT	6 inch reflectorized white line (epoxy)	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

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Item No.	Estimated Quantity*	Bid Description Unit or Lump Sum Price Bid in Both Words and Figures	Total in Figure
868.12	710 FT	12 inch reflectorized white line (epoxy)	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
868.3	55 SF	Bicycle symbol white (epoxy)	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
869.06	100 FT	6 inch reflectorized yellow line (epoxy)	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
869.1	9,000 SF	Green paint for bike lanes (epoxy)	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

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Item No.	Estimated Quantity*	Bid Description Unit or Lump Sum Price Bid in Both Words and Figures	Total in Figure
874.2	28 EA	Traffic sign removed and reset	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
874.21	1 EA	Miscellaneous sign removed and reset	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

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UTILITY ITEMS			
1	DRAINS COMPLETE IN PLACE		
1a	200 LF	15-inch Class IV RCP drains	\$ _____
		and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
1b	87 LF	18-inch Class IV RCP drains	\$ _____
		and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
1c	30 LF	21-inch Class IV RCP drains	\$ _____
		and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

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Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
1d	32 LF	36-inch Class IV RCP drains, 5' to 10' deep	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
1e	254 LF	36-inch Class IV RCP drains, >10' to 15' deep	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
1f	244 LF	42-inch DI drains	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
1g	805 LF	48-inch Class IV RCP drains, 5' to 10' deep	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

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Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
1h	1,459 LF	48-inch Class IV RCP drains, >10' to 16' deep	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
1i	575 LF	12-inch catch basin lateral	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
2		SEWERS COMPLETE IN PLACE	
2a	153 LF	8-inch PVC pipe	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

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Item No.	Estimated Quantity*	Bid Description Unit or Lump Sum Price Bid in Both Words and Figures	Total in Figure
2b	35 LF	8-inch DI pipe	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
2c	273 LF	12-inch PVC pipe, 5' to 10' deep	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
2d	503 LF	12-inch PVC pipe, >10' to 15' deep	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
2e	948 LF	12-inch PVC pipe, >15' to 20' deep	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

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Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
3		BUILDING CONNECTION SYSTEMS	
3a	62 EA	12X6 wye or tee branches	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
3b	1 EA	8X6 wye or tee branches	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
3c	165 VF	Chimney	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

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Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
3d	1,380 LF	6-inch building connections	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
3e	84 EA	Push camera inspection of existing building connection	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
3f	46 EA	Dye testing of existing building connection	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
3g	19 EA	Relocate Elm Street sewer service to separate sewer	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

*Quantity assumed for comparison of bids.

**The unit price in Item 13a is the minimum allowed for rock excavation and disposal. The bidder may add to the minimum in Item 13b.

Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
4		MANHOLES AND CATCH BASINS	
4a	14 EA	4' diameter precast concrete manhole base	\$ _____

		and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
4b	183 VF	4' diameter precast concrete manhole walls & cones	\$ _____

		and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
4c	3 EA	6' diameter precast concrete manhole base	\$ _____

		and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

*Quantity assumed for comparison of bids.

**The unit price in Item 13a is the minimum allowed for rock excavation and disposal. The bidder may add to the minimum in Item 13b.

Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
4d	34 VF	6' diameter precast concrete manhole walls & cones	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
4e	2 EA	8' diameter precast concrete manhole base	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
4f	17 VF	8' diameter precast concrete manhole walls & cones	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
4g	1 EA	10' diameter precast concrete manhole base	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

*Quantity assumed for comparison of bids.

**The unit price in Item 13a is the minimum allowed for rock excavation and disposal. The bidder may add to the minimum in Item 13b.

Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
4h	13 VF	10' diameter precast concrete manhole walls & cones	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
4i	2 EA	4' tee precast concrete manhole base	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
4j	27 VF	4' tee precast concrete manhole walls & cones	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
4k	3 VF	7' x 7' precast box manhole base	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

*Quantity assumed for comparison of bids.

**The unit price in Item 13a is the minimum allowed for rock excavation and disposal. The bidder may add to the minimum in Item 13b.

Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
4l	25 VF	7' x 7' precast box manhole walls and top slab	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
4m	1 LS	Furnish & install 14' x 8' precast concrete vault complete	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
4n	5 EA	Precast concrete catch basin (TYPE A) with single frame & cascade grate	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
4o	15 EA	Precast concrete catch basin (TYPE A) with double frame & cascade grate	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

*Quantity assumed for comparison of bids.

**The unit price in Item 13a is the minimum allowed for rock excavation and disposal. The bidder may add to the minimum in Item 13b.

Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
4p	4 EA	Precast concrete catch basin (TYPE B) with single frame & cascade grate	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
4q	7 EA	Precast concrete catch basin (TYPE B) with double frame & cascade grate	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
4r	21 EA	Furnish & install manhole frame and cover	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
4s	4 EA	Furnish & install bolted & gasketed watertight frame and cover	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

*Quantity assumed for comparison of bids.

**The unit price in Item 13a is the minimum allowed for rock excavation and disposal. The bidder may add to the minimum in Item 13b.

Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
4t	3 EA	Abandon manhole or catch basin	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
4u	42 VF	Cementitious lining of manholes	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
5		CLEANING AND INSPECTION OF SEWERS	
5a	910 LF	Cleaning and inspection of 8-inch to 12-inch sewers	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

*Quantity assumed for comparison of bids.

**The unit price in Item 13a is the minimum allowed for rock excavation and disposal. The bidder may add to the minimum in Item 13b.

Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
6		CURED-IN-PLACE PIPE	
6a	213 LF	8-inch cured-in-place pipe	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
6b	838 LF	12-inch cured-in-place pipe	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
6c	10 EA	Grout reinstated service connections	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

*Quantity assumed for comparison of bids.

**The unit price in Item 13a is the minimum allowed for rock excavation and disposal. The bidder may add to the minimum in Item 13b.

Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
7		WATER MAINS AND FITTINGS	
7a	35 LF	6-inch ductile iron pipe & fittings	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
7b	451 LF	8-inch ductile iron pipe & fittings	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
7c	2,455 LF	12-inch ductile iron pipe & fittings	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

*Quantity assumed for comparison of bids.

**The unit price in Item 13a is the minimum allowed for rock excavation and disposal. The bidder may add to the minimum in Item 13b.

Item No.	Estimated Quantity*	Bid Description Unit or Lump Sum Price Bid in Both Words and Figures	Total in Figure
7d	2,000 LBS	Additional fittings	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
8		POLYETHYLENE ENCASEMENT	
8a	2,941 LF	Polyethylene encasement	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
9		HYDRANTS AND VALVES	
9a	6 EA	Hydrant assembly	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

*Quantity assumed for comparison of bids.

**The unit price in Item 13a is the minimum allowed for rock excavation and disposal. The bidder may add to the minimum in Item 13b.

Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
9b	6 EA	Remove existing hydrant	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
9c	1 EA	6-inch gate valve	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
9d	7 EA	8-inch gate valve	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
9e	11 EA	12-inch gate valve	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

*Quantity assumed for comparison of bids.

**The unit price in Item 13a is the minimum allowed for rock excavation and disposal. The bidder may add to the minimum in Item 13b.

Item No.	Estimated Quantity*	Bid Description Unit or Lump Sum Price Bid in Both Words and Figures	Total in Figure
9f	1 LS	Furnish & Install Check Valve Manhole	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
10		WATER SERVICE CONNECTIONS	
10a	77 EA	3/4" corporation stops	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
10b	77 EA	3/4" curb stops	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

*Quantity assumed for comparison of bids.

**The unit price in Item 13a is the minimum allowed for rock excavation and disposal. The bidder may add to the minimum in Item 13b.

Item No.	Estimated Quantity*	Bid Description Unit or Lump Sum Price Bid in Both Words and Figures	Total in Figure
10c	1,482 LF	3/4" copper piping and fittings	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
11		TEMPORARY SERVICE PIPING	
11a	2,382 LF	2-inch temporary service main	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
11b	1,742 LF	4-inch temporary service main	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

*Quantity assumed for comparison of bids.

**The unit price in Item 13a is the minimum allowed for rock excavation and disposal. The bidder may add to the minimum in Item 13b.

Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
12		MISCELLANEOUS EARTHWORK	
12a	12,900 CY	Excavation and backfill of unsuitable material above normal grade	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
12b	600 CY	Excavation and backfill of unsuitable material below normal grade	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
12c	490 TON	Removal and disposal of Group A contaminated Material	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

*Quantity assumed for comparison of bids.

**The unit price in Item 13a is the minimum allowed for rock excavation and disposal. The bidder may add to the minimum in Item 13b.

Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
12d	120 TON	Removal and off-site treatment/recycling of Group B contaminated material	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
12e	500 CY	Test pits	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
12f	50 CY	Bentonite clay dams	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
12g	100 CY	Additional crushed stone	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

*Quantity assumed for comparison of bids.

**The unit price in Item 13a is the minimum allowed for rock excavation and disposal. The bidder may add to the minimum in Item 13b.

Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
12h	100 CY	Additional concrete encasement	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
13		ROCK EXCAVATION AND DISPOSAL	
13a	575 CY	Rock excavation and disposal (min)	<u>\$57,500.00</u>
		One hundred _____	
		and _____ (dollars)	
		Zero _____	
		_____ (cents)	
		(\$ 100.00 _____)	
13b	575 CY	Rock excavation and disposal (add'l)	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

*Quantity assumed for comparison of bids.

**The unit price in Item 13a is the minimum allowed for rock excavation and disposal. The bidder may add to the minimum in Item 13b.

Item No.	Estimated Quantity*	Bid Description Unit or Lump Sum Price Bid in Both Words and Figures	Total in Figure
14		SEWER, WATER, AND DRAIN RECONSTRUCTION	
14a	18 EA	Sewer, water, and drain reconstruction within trench limits	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
15		TEMPORARY BYPASS PUMPING SYSTEM	
15a	1 LS	Temporary bypass pumping system	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	
16		RODENT CONTROL	
16a	1 LS	Rodent control, lump sum	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

*Quantity assumed for comparison of bids.

**The unit price in Item 13a is the minimum allowed for rock excavation and disposal. The bidder may add to the minimum in Item 13b.

Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
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MOBILIZATION & PRICE ADJUSTMENTS

17 MOBILIZATION

17a	1 LS	Mobilization	\$ _____
		_____ and _____ (dollars)	
		_____ (cents)	
		(\$ _____)	

18 PRICE ADJUSTMENTS

18a	3,702 GALLONS	Price Adjustment for Diesel fuel used in excavation and borrow work, where price variance is five (5) percent or greater	\$703.38
		Zero	
		_____ and _____ (dollars)	
		Nineteen	
		_____ (cents)	
		(\$ 0.19 _____)	
18b	2,931 GALLONS	Price Adjustment for Gasoline used in excavation and borrow work, where price variance is five (5) percent or greater	\$527.58
		Zero	
		_____ and _____ (dollars)	
		Eighteen	
		_____ (cents)	
		(\$ 0.18 _____)	

*Quantity assumed for comparison of bids.

**The unit price in Item 13a is the minimum allowed for rock excavation and disposal. The bidder may add to the minimum in Item 13b.

Item No.	Estimated Quantity*	Bid Description Unit or Lump Sump Price Bid in Both Words and Figures	Total in Figure
18c	9,773 GALLONS	Price Adjustment for Diesel fuel used in surfacing work (paving), where price variance is five (5) percent or greater Zero and (dollars) Nineteen (cents) (\$ 0.19)	<u>\$1,856.87</u>
18d	185 TONS	Price Adjustment for Liquid Asphalt used in hot mix asphalt mixtures, where price variance is five (5) percent or greater Forty Five and (dollars) Zero (cents) (\$ 45.00)	<u>\$8,325.00</u>

TOTAL AMOUNT OF BID

The computed contract price for all Items inclusive is:

_____ Dollars and
_____ Cents (\$_____).

*Quantity assumed for comparison of bids.

**The unit price in Item 13a is the minimum allowed for rock excavation and disposal. The bidder may add to the minimum in Item 13b.

Addendum No. 3 to IFB 16-48

Attachment 2

Revisions to Specifications Section 02000, ROADWAY SPECIAL PROVISIONS

SECTION 02000

ROADWAY SPECIAL PROVISIONS CEDAR STREET SEWER SEPARATION PROJECT SOMERVILLE, MA

SCOPE OF WORK

The approximate scope of work includes but is not necessarily limited to the installation of: 2,794 linear feet of 36-inch to 48-inch RCP drain; 1,951 linear feet of 8-inch to 12-inch PVC sewer; 1,374 linear feet of 6-inch PVC building connections; 24 precast manholes; 31 precast catch basins; 1,051 linear feet of 8-inch to 12-inch cured-in-place pipe; 2,827 linear feet of 8-inch to 12-inch DI water mains; 6 Hydrants; 1,353 linear feet of water service connections; traffic signal replacement; full width road reconstruction including sidewalk replacement; and other related tasks.

All roadway/traffic related work done under this contract shall be in conformance with the, Massachusetts Highway Department Standard Specifications for Highways and Bridges, dated 1988, as amended, the Supplemental Specifications dated June 15, 2012, 2006 Massachusetts Highway Department Project Development and Design Guide. The Standard Special Provisions dated October 19, 2012, the 2012 Construction Standard Details, the 2009 Manual on Uniform Traffic Control Devices, with Massachusetts Amendments, the 1990 Standard Drawings for Signs and Supports. The 1968 Standard Drawings for Traffic Signals and Highway Lighting, the latest edition of American Standard of Nursery Stock, the Plans detail sheets the Special Provisions and all amendments will govern.

WORK SCHEDULE

The Contractor shall conduct all construction activity Monday through Friday between the following hours:

1. Elm Street – 7:00 a.m. and 7:00 p.m.
2. Cedar Street Phase 1 – 8:30 a.m. and 7:00 p.m.
3. Cedar Street Phase 2 & 3 – 7:00 a.m. and 7:00 p.m.

No work shall be done on this contract on Saturday, Sunday, a State or Federal holiday or on the day before or the day after a long weekend that involves a holiday without prior approval by the Engineer. Night work shall only be by City's prior approval.

PUBLIC SAFETY AND CONVENIENCE (Supplementing Subsection 7.09)

The Contractor shall provide necessary access for fire apparatus and other emergency vehicles through the work zones to abutting properties at all times. Sidewalks should be accessible for pedestrians at all times.

Sweeping and cleaning of surfaces beyond the limits of the project to clean up material caused by spillage or vehicular tracking during the various phases of the work shall be considered as

incidental to the work being performed under the Contract and there will be no additional compensation.

NOTICE TO OWNERS OF UTILITIES (Supplementing Subsection 7.13)

Before commencing work on service connections, the Contractor shall be responsible for contacting the Electric Company servicing the area to obtain construction requirements, standards, and to give adequate notice of commencement of work. The Contractor's attention is further directed to the requirements of Work in the Immediate Vicinity of Certain Underground Structures and Poles herein included in these Special Provisions.

The Contractor shall make his own investigation to assure that no damage to existing structures, drainage lines, traffic signal conduits, and other utilities will occur as a result of his operations.

The Contractor shall notify "Mass. DIG SAFE" and procure a DIG SAFE number of each location prior to disturbing ground in any way.

"DIG-SAFE" Call Center: Telephone 1-800-344-7233

PROTECTION OF UTILITIES AND PROPERTY (Supplementing Subsection 7.13)

The Contractor, in constructing or installing facilities alongside or near sanitary sewers, storm drains, water or gas pipes, electric or telephone conduits, poles, sidewalks, walls, vaults or other structures shall, at his expense, sustain them securely in place, cooperating with the officers and agents of the various utility companies and municipal departments which control them, so that the services of these structures shall be maintained. The Contractor shall also be responsible for the repair or replacement, at his own expense, of any damage to such structures caused by his acts or neglect, and shall leave them in the same condition as they existed prior to commencement of the work. In case of damage to utilities, the Contractor shall promptly notify the utility owner and shall, if requested by the Engineer, furnish labor and equipment to work temporarily under the utility owner's direction in providing access to the utility. Pipes or other structures damaged by the operation of the Contractor may be repaired by the City or by the utility owner that suffers the loss. The cost of such repairs shall be borne by the Contractor, without compensation therefore.

If, as the work progresses, it is found that any of the utility structures are so placed as to render it impracticable, in the judgment of the Engineer, to do the work called for under this Contract, the Contractor shall protect and maintain the services in such utilities and structures and the Engineer will, as soon thereafter as reasonable, cause the position of the utilities to be changed or take such other actions deemed suitable and proper.

If live service connections are to be interrupted by excavations of any kind, the Contractor shall not break the service until new services are provided. Abandoned services shall be plugged off or otherwise made secure.

Full compensation for furnishing all labor, materials, tools, equipment and incidentals for doing all the work involved in protecting or repairing property as specified in this section, shall be

considered included in the prices paid for the various Contract items of work and no additional compensation will be allowed therefore.

WORK IN THE IMMEDIATE VICINITY OF CERTAIN UNDERGROUND STRUCTURES AND UTILITY POLES

Before starting work at existing manholes, the Contractor shall test for gas and blow out the manholes.

PROVISIONS FOR TRAVEL AND PROSECUTION OF THE WORK (Supplementing Subsection 8.03)

Before starting any work under this Contract, the Contractor shall prepare, and submit to the Engineer for approval, a plan (based on the Contract traffic management plans) that indicates the traffic routing proposed by the Contractor during the various stages and time periods of the work and the temporary barricades, signs, drums and other traffic control devices to be employed during each stage and time period of the work to maintain traffic and access to abutting properties.

Particular care shall be taken to establish and maintain methods and procedures that will not create unnecessary or unusual hazards to public safety. Traffic control devices required only during working hour operations shall be removed at the end of each working day.

Signs having messages that are irrelevant to normal traffic conditions shall be removed or properly covered at the end of each work period. Signs shall be kept clean at all times and legends shall be distinctive and unmarred.

DISPOSAL OF SURPLUS MATERIALS

All existing and other materials not required or needed for use on the project, and not required to be removed and stacked, shall become the property of the Contractor and shall be removed from the site during the construction period and legally disposed of. No separate payment will be made for this work, but all costs in connection therewith shall be included in the prices bid for various Contract items.

MATERIALS AND EQUIPMENT REMOVED AND STACKED

All materials scheduled to be removed and stacked shall be delivered to the DPW maintenance facility or storage yard located at 257 Fisher Street Somerville, MA 02038. If the Engineer determines that any part of the stacked materials is unsuitable for re-use, or if the City decides to abandon part or all of such materials, said materials shall become the property of the Contractor and he shall dispose of them outside and away from the limits of the project, without additional compensation.

PROPERTY ACCESS

The Contractor shall provide and maintain access at all times to all properties abutting the work. Final pavement installation on the public ways shall be performed after all other work is finished. The Contractor may be required to install temporary measures (i.e. wood planking bridges) across excavated areas of sidewalk to allow safe access to buildings and/or storefronts. Such measures will require approval from the City of Somerville and the Engineer prior to installation and are considered incidental to the contract.

CONCRETE FOUNDATIONS

Concrete foundations of items to be removed, if not interfering with the proposed construction, may be abandoned in place with written acceptance of the Engineer. Foundations left in place under the roadway surface shall be removed to a depth of three feet (3') below the finished grade; all other foundations left in place shall be removed to a depth of six inches (6") below the finished grade. The top six inches (6") shall be restored to match the existing grade with materials similar in kind to the adjacent materials.

TREE REMOVAL

Existing trees shown on the plans or required by the Engineer to be removed that are smaller than 9- inches in diameter shall be considered incidental to the project. The Contractor shall coordinate with the City of Somerville Tree Warden prior to marking or removal of any trees within the project limits and will not mark or remove any tree within the project limits without approval from the City of Somerville.

BOUNDS

The Contractor shall exercise due care when working around all bounds which are to remain. Should any damage to a bound result from the actions of the Contractor, it shall be replaced and/or realigned by the Contractor as required by the Engineer. No further compensation will be due the Contractor for the materials and labor required to reestablish the bound in its proper orientation. All bounds, including new bounds as shown on the plans, and bounds replaced or realigned shall be installed by a Land Surveyor registered in the Commonwealth of Massachusetts.

Bounds shown on the plans to be removed shall be carefully removed and delivered and stacked at the City DPW maintenance facility or storage yard located at 257 Fisher Street Somerville, MA 02038 unless otherwise required. The cost of this work shall be considered incidental to the project.

EXISTING BRICK OR FLAGSTONE WALKS

The Contractor will be required to reset or relay existing brick or flagstone property access walks. This work will be considered incidental to the project and will include all materials, equipment, tools and labor to complete the work including new bricks as shown on the plans or as directed by the Engineer.

ITEM 102.51**INDIVIDUAL TREE PROTECTIONS****EACH****GENERAL**

The purpose of this item is to prevent damage to branches, stems and root systems of existing individual trees to remain and to ensure their survival. Provisions under this item include steps to minimize soil and root disturbance and to construct protection measures for trees close to construction areas.

The work under this item shall conform to the relevant provisions of Sections 101 and 771 and the following:

Examination of Conditions

The Contractor shall be solely responsible for judging the full extent of the work requirements, including, but not necessarily limited to any equipment and materials necessary for providing tree protection.

Prior to any construction activities, the Contractor and Arborist shall walk the site with the Engineer and City Tree Warden to identify which trees will require protection and to determine approved measures. The Arborist shall make recommendations as to appropriate methods to trees. The Engineer will have final decision as to trees and methods.

The Contractor is responsible for the protection of all existing trees and plants within and immediately adjacent to the construction area that are not designated to be removed for the length of the construction period.

Incidental to the cost of these items, the Contractor shall retain the services of a certified arborist, who shall make recommendations as to the specific appropriate treatment of trees within or near the work zone.

SUBMITTALS

Incidental to this item, the Contractor shall provide to the Engineer one (1) copy each of the American National Standards Institute (ANSI) Standard Z-133.1 and A300 Standard Practices for Tree, Shrub, and Other Woody Plant Maintenance, Part 1: Pruning. These references shall be kept by the Engineer at his office for the length of the Contract.

Prior to start of work, the Contractor shall submit to the Engineer the name and certification number of the Massachusetts Certified Arborist referenced herein. Cost for Certified Arborist for all activities pertaining to this Item shall be incidental to this item.

MATERIALS

Fence and temporary fence posts shall be subject to the approval of the Engineer.

Staking for individual tree protection fencing shall be steel posts or 2x4-inch stock as required and approved by the Engineer.

Wood chips shall conform to provisions of Wood Chip Mulch under Materials Section M6.04.3.

Trunk protection shall be 2x4-inch cladding, at least 8 feet in length, clad together with wire. Trunk protection shall include burlap.

Incidental to these items, the Contractor shall provide water for maintaining plants in the construction area that will have exposed root systems for any period during construction.

CONSTRUCTION METHODS

To the extent possible, to avoid soil compaction within the root zone, construction activities including, but not limited to, vehicle movement, excavation, embankment, staging and storage of materials or equipment shall not occur underneath the canopy (drip line) of trees to remain. Where these activities will occur within 10 Feet of the canopy of trees, the Contractor shall provide Individual Tree Protection as specified herein.

Tree Fencing and Armoring

For individual tree protection, the Contractor shall set posts and fencing at the limits of the tree canopy. Where construction activities closer to the trees are unavoidable, the Contractor shall tie branches out of the way and place wood chips to a depth of 6-inches on the ground to protect the root systems. The Contractor shall wrap the area of the trunk of the tree with burlap prior to armoring with 2x4-inch cladding. Cladding for tree trunks shall extend from the base of the tree to at least 8 feet from the base.

Where excavation within canopy is unavoidable, the Contractor shall use equipment and methods that shall minimize damage to the tree roots, per recommendations of the Certified Arborist. Such methods may require root pruning prior to, as well as during, any excavation activities.

All fencing, trunk protection, branch protection, and woodchips shall be maintained throughout the duration of the contract. Protective fencing shall be repaired and woodchip mulch replaced as necessary during the duration of the contract at no additional cost.

Cutting and Pruning

Some pruning of roots and branches may be a necessary part of construction. Pruning will be performed on the same side of the tree that roots have been severed.

The Contractor shall retain the services of a Massachusetts State Certified Arborist to oversee any cutting of limbs, stem or roots of existing trees. All cuts shall be clean and executed with an approved tool. Under no circumstances shall excavation in the tree protection area be made with mechanical equipment that might damage the existing root systems.

Any tree root area exposed by construction shall be covered and watered immediately. Exposed tree roots shall be protected by dampened burlap at all times until they can be covered with soil.

Watering

Water each tree within the construction area where work is in progress twice per week until the surrounding soil of each tree is saturated for the duration of construction activities.

Removal of Protection

After all other construction activities are complete, but prior to final seeding, wood chips, temporary fencing, branch protection, and trunk protection materials shall be removed and disposed off site by the Contractor at no additional cost.

Tree Damage

The Contractor shall be held responsible for the health and survival of the existing trees in the immediate vicinity of the of the construction area. Damage that, in the Engineer's opinion, can be remedied by corrective measures shall be repaired immediately. Broken limbs shall be pruned according to industry standards. Wounds shall not be painted. Trees or shrubs that are damaged irreparably shall, at the Engineer's discretion, be replaced per the requirements of Division I of these Special Provisions. Cost of replacement trees shall be borne by the Contractor.

BASIS OF PAYMENT

Where the plans show specific, individual trees to remain and where grading or other disturbance is shown within the drip line of these trees or where the Engineer determines that an individual tree must be protected, these trees shall be protected and paid for under ITEM 102.51, Individual Tree Protection.

Item payment shall be scheduled throughout the length of contract: 30 percent of value shall be paid upon installation, 30 percent approximately halfway through the contract, and the remainder to be paid at the end of the contract after completion of construction operations that would disturb plants and after the protection materials have been removed and properly disposed of off-site by the Contractor.

Compensation for Individual Tree Protection will be paid for at the contract unit price PER EACH under Item 102.51. This shall include full compensation for all labor, equipment, materials, and incidentals for the satisfactory completion of the work, including the services of a certified arborist, water and fertilizer, and the subsequent removal and satisfactory disposal of the protective materials upon completion of the contract.

Cost of wood chips, as required, shall be incidental to these items.

ITEM 120.1	UNCLASSIFIED EXCAVATION	CUBIC YARDS
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Work under this item shall conform to Section 100 of the Standard Specification and the following:

Unclassified Excavation shall include the removal of tree pits, fences, drain pipe, brick walk, concrete walk, HMA walk and any other items to be removed not covered under other items of work. This item also includes any additional excavation required below the level of reclamation on Cedar Street to be able to meet the proposed grades as indicated on the plans.

ITEM 153.	CONTROLLED DENSITY FILL (EXCAVATABLE)	CUBIC YARDS
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Work under this item shall conform to Section 150 of the Standard Specification and the following:

Controlled Density Fill (CDF) –Excavatable – shall be placed in trench/utility areas crossing roadway areas. CDF shall conform to the provisions of M4.08.0 for Type 2E CDF.

Item 153. will be measured and paid for at the contract unit price per Cubic Yard, which price shall include all labor, materials, and finishing, along with all incidental costs required to complete the work.

ITEM 403.	RECLAIMED PAVEMENT FOR BASE COURSE AND/OR SUB BASE	SQUARE YARD
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ITEM 482.3	SAWING ASPHALT PAVEMENT	FEET
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ITEM 482.4	SAWING CONCRETE PAVEMENT	FEET
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The work under these items shall conform to the relevant provisions of Section 400 of the Standard Specifications and the following:

Reclaimed Pavement for Base Course and/or Sub-base shall be in close conformity with the Standard Specifications. *In addition, the removal of reclaimed material to an offsite stockpile while utility work is being performed and before the roadway base is graded and compacted is incidental to the item.*

The work shall include the sawing of existing asphalt or concrete pavement where shown on the plans, and as required by the Engineer.

Equipment used to sawcut the existing pavement shall be approved by the Engineer prior to commencing work.

The existing pavement shall be sawcut through its full depth, or to the elevation of the abutting proposed pavement subgrade, whichever is lesser, at all joints between existing and proposed pavements, and at all utility trenches through existing pavement to remain, to provide a uniform, vertical surface for the proposed pavement joint with the existing pavement. Sawcut edges that become broken, ragged or undermined as a result of the Contractor's operations shall be re-cut prior

to the placement of abutting proposed pavement at no additional cost to the Owner. Sawcut surfaces in hot mix asphalt shall be sprayed or painted with a uniform, thin coat of RS-1 asphalt emulsion immediately before placement of bituminous concrete material against the surfaces.

Reclaimed Pavement for Base Course and/or Sub-base shall be measured and paid for at the contract Unit Price per Square Yard and include all compensation for lowering and plating of utility castings, crushing, pulverizing, blending, spreading, grading, sawcutting the existing pavement, compacting, blending with aggregate, *moving the processed material from one location to another within the project and any incurred costs resulting from the Contractors decision to process off site. For this project the removal and stockpiling of reclaimed material off site to allow for utility construction activities and cost for trucking same material between locations will be considered incidental to the cost and no additional compensation will be allowed for this operation.*

Sawing Asphalt Pavement and Sawing Concrete Pavement will be measured for payment by the foot on the pavement surface complete in place. Sawing Asphalt Pavement and Sawing Concrete Pavement will be paid for at the Contract unit price per foot, which price shall include all labor, materials, equipment, and incidental costs required to complete the work including asphalt emulsion.

ITEM 580. CURB REMOVED AND RESET FOOT

The work under this item shall conform to the relevant provisions of Section 580 of the Standard Specifications and the following:

All existing curbing to be removed and reset shall be cleaned and sand blasted to create a clean consistent finish, free from oil, grease, paint or other deleterious materials.

Measurement and payment for item 580. shall be at the contract unit price per FOOT and include removal, cleaning, sandblasting and resetting of existing curb to the lines and grades indicated on the contract drawings.

ITEM 705.1 FLAGSTONE WALK REMOVED AND RESET SQUARE YARD

The work under these items shall conform to the relevant provisions of Section 700 of the Standard Specifications and the following:

Flagstone walks that may need to be adjusted by removal and replacement shall be done with a minimum of disruption and be replaced on a cement concrete base in the same location as existing and to the adjusted grades as indicated on the plans. New flagstone shall be utilized for replacement of broken flagstones under item 705.1.

Payment for items 705.1 shall be paid for at the contract unit price, complete in place, per Square Yard.

ITEM 715.1**MAIL BOX REMOVED AND RESET****EACH**

The work under this item shall conform to the relevant provisions of Section 700 of the Standard Specifications and the following:

This item includes removing, temporary stacking and resetting of mail boxes as shown on the plans and as required by the Engineer, including attachment to the proposed cement concrete sidewalk.

ITEM 776. KARPRICK RED MAPLE 3.5 INCH CALIPER EACH

The work under this item shall conform to the relevant provisions of Section 771 of the Standard Specifications and the following:

For the above items the Contractor shall provide and install plant material of genus, species, variety, size and quantities in locations as indicated on the contract plans. The work of this section includes, but is not limited to, the following:

- A. Purchasing and transporting plant material to construction sites
- B. Removal and resetting of existing young, recently planted trees
- C. Installation of plant material
- D. Plant care during 60-day Maintenance Period and one-year Establishment Period
- E. Replacement of defective or dead plants at End of Maintenance Period
- F. Replacement of defective or dead plants at End of Establishment Period

Cooperation By Contractor (Supplementing Subsection 5.05)

The Landscape Contractor shall have five years continuous experience and expertise in management, handling and installation of ornamental plant material in large scale landscape construction projects. Site foreman shall have at least five years experience and shall be on-site during all times of plant installation.

Samples and Submittals

Plant Material: At least 180 days prior to anticipated planting, the Contractor shall submit a confirmation of availability for all plants on the list, accompanied by nursery sources. When the specified types and sizes of plants are not available, substitutions may be made upon request by the Contractor, if approved in writing by the Engineer. Substitutions proposed by the Contractor shall have equivalent overall form, height, and horticultural characteristics and must be approved in writing by the Engineer prior to tagging. At least 30 days prior to planting, the Contractor shall submit a schedule for tagging material to the Engineer.

For all other materials, at least 30 days prior to ordering, the Contractor shall submit to the Engineer material specifications and (where applicable) installation instructions attesting that the following materials meet the requirements specified. No materials shall be ordered until submittals have been approved by the Engineer. Delivered materials shall match the samples.

All material samples shall include supplier's literature and certification that material meets specifications. Submittals, including samples, material specifications, and installation specifications are as follows

Soil wetting agent: Submit two pound sample with supplier specifications and certification.

Fungal mycorrhizae: Submit sample with supplier specifications and certification.

Loam: The Contractor shall submit two 10 pound samples of loam to be used as backfill per the requirements of Section 751 of the Standard Specifications, accompanied by laboratory certified test results per the requirements of Section 751.

Backfill Mix: The contractor shall submit a 10 pound representative sample of existing soil, which shall then be mixed with loam and tested according to the requirements specified herein. Mixing shall be done in the presence of the Engineer.

Water: Submit a watering schedule, including sources of water, methods of irrigation, and any incidental work required to provide water for the plants.

Testing Methods: The Contractor shall submit to the Engineer for his inspection and approval, equipment and methods for testing soil moisture and soil pH.

The Contractor shall provide to the Engineer two new functioning moisture gauges, including instructions for use and batteries if required, for his use during the duration of the Contract. The meters shall be hand held, and shall be capable of measuring moisture at a depth of 6-inches. The scale shall be sufficient to determine moist, dry, or wet soil. The meters shall be regularly checked for calibration against watered loam, and shall be replaced if found faulty at no additional cost.

In addition, the Contractor shall provide to the Engineer one copy of the "American Standard for Nursery Stock," ANSI Z-60.1, latest edition, published by American Association of Nurserymen (AAN) for the duration of this Contract.

References and Standards

The following standards shall apply to the Work of this Section.

ASNS: "American Standard for Nursery Stock," ANSI Z-60.1, latest edition, published by American Association of Nurserymen (AAN).

Manual of Woody Landscape Plants: Their Identification, Ornamental Characteristics, Culture, Propagation and Uses. Michael Dirr. Stipes Publishing Company, latest edition.

Examination of Conditions

The Contractor shall be responsible for judging the full extent of work requirements involved. This responsibility includes, but is not limited to, the following: transportation, purchase, temporary storage and maintenance of plants; plant re-handling prior to final installation; removal and off-site

disposal of existing loam determined by the Engineer to be unacceptable; purchase, transport, and supply of loam.

Plant Materials

The Contractor shall furnish all plants as shown on the plans, unless otherwise required in writing by the Engineer. All plants shall be nursery grown.

All plants shall be legibly tagged with the botanical name. Only plant stock grown within hardiness Zones 1 through 6a, as established by the USDA Plant Hardiness Zone Map, will be accepted. The Contractor's suppliers must certify in writing that the stock has actually been grown under Zone 6a or hardier conditions. Plants not so certified will not be accepted.

All plants shall be typical of their species or variety in growth habit. Plant sizes, habit, rootballs, and containers shall be in accordance with the American Standard for Nursery Stock (ASNS), Standards of the American Association of Nurserymen (AAN) as a minimum requirement for acceptance.

All plants must be moved with the root systems in soil. Balled and burlapped plants shall be wrapped with untreated 8 ounce burlap, firmly held in place by a stout cord. Wire containers shall be of sufficient size to allow root development for the plant size, per ASNS requirements. Plants prepared with plastic or other non-biodegradable wrappings will not be accepted. Rootballs shall remain intact during all operations. No plant will be accepted if the rootball has been badly cracked or broken prior to, or during, the process of planting. Rootballs shall be moist upon arrival and shall be kept moist until installation. All balled and burlapped plants that cannot be planted at once must be heeled in by setting them in the ground, covering the rootballs with soil, and watering them adequately.

Container-grown stock shall have been grown in the container long enough for the root system to have developed sufficiently to hold its soil together firmly. No plants shall be loose in the container. Container-grown plants shall not be pot bound, with spiraling roots or roots growing densely against the sides of the container. Score or butterfly cut rootball of all container-grown plants prior to planting.

Each plant shall have plenty of fibrous roots, healthy buds, and shall be free of disease or insect pests, eggs or larvae. All plant parts shall show active green cambium when cut. They shall be densely foliated when in leaf.

The trunk of each tree shall be free from sun scald, frost cracks, or wounds resulting from abrasions, fire or other causes. Pruning wounds shall be no larger than 2-inches and shall show vigorous scar tissue. No trees with double-leaders or twin-heads will be acceptable without the written approval of the Engineer. No plant material from cold storage will be accepted. In regards to shrubs, no single stemmed or thin plants will be accepted. The side branches must be generous and well-twiggged, and the plant as a whole must be well-branched to the ground. The plants must be in a vigorous condition, free from dead wood, bruises or other root or branch injuries.

Loam Borrow

Loam borrow, sometimes referred to as loam, for planting soil mix shall be in accordance with the requirements of Standard 751 of the Standard Specifications.

Soil Amendments

Soil amendments, including ground limestone, sulfur, gypsum, and organic materials, shall meet the requirement of Loam Borrow, as described herein.

Planting Soil Mix

Planting soil for backfill shall be a mixture of equal parts approved loam and excavated material. Mixed material shall be pH tested by the Contractor in the presence of the Engineer, and adjusted according to particular planting applications, using lime or sulfur as required. For plants that require an acid soil, such as ericaceous plants and broad-leaved evergreens, planting soil shall have a true pH of 4.5 to 5.5. Planting soil for all other plants shall have a true pH value of 6.0 to 6.5. Proposed soil amendments shall be submitted to the Engineer for approval prior to application.

Bark Mulch

Bark mulch shall be shredded pine bark aged a minimum of six (6) months. The mulch shall be dark brown in color, free of chunks and pieces of wood thicker than 1/4-inches and shall not contain, in the judgement of the Engineer, an excess of fine particles. Unless otherwise specified in these special provisions, bark mulch shall be incidental to the cost of the planting items. Do not use wood chips.

Water

The Contractor shall be responsible for furnishing his own supply of water to the site at no extra cost. All plants injured or damaged due to the lack of water, or due to the use of too much water, shall be the Contractor's responsibility to correct. Water shall be free from impurities injurious to vegetation.

Soil Wetting Agent

Soil Wetting Agent shall be a synthetic, non-toxic acrylic polyacrylamide or natural soluble plant extract. Application rates shall be per manufacturer's recommendations.

Fungal Mycorrhizae

Each plant shall be planted with fungal mycorrhizae. Mycorrhizae shall include at least three species of vesicular arbuscular (endomycchorizal) fungi as well as ectomycorrhizal fungi. Mycorrhizae shall be shipped in individual dosage packets.

Furnishing and planting of plant material shall include, but is not limited to, the following: digging of the pits and plant beds; amendment of loam as required to produce planting soil mix; provision

of soil additives for pH requirements of specific plants; provision of soil wetting agents; provision of mycorrhizal fungi; furnishing the plants as specified; plant installation; watering and maintenance.

Seasons for Planting

Spring: Deciduous materials - March 21 through May 1
 Evergreen materials - April 15 through June 1

Fall: Deciduous materials - Oct. 1 through Dec. 1
 Evergreen materials - Aug. 15 through October 15

Requests for exceptions to this schedule shall be submitted in writing to the Engineer for his approval.

Plant Tagging and Approval

The Contractor shall locate, secure, tag, and ship plant material in a sufficiently timely manner to ensure minimal substitution and storage of plants.

Plants shall be tagged at least one month prior to the expected planting date. The Contractor shall be responsible for tagging the material at the nursery and providing a representative. The Contractor shall request that the Engineer provide a representative to approve tagged stock to be planted under this Section. Contractor shall tag or allow the nursery to tag material for approval of the Engineer's representative. In the event that satisfactory material cannot be located, the Contractor shall be responsible for any necessary travel and overnight accommodations for the Engineer's representative during the period of time required to locate, select, and approve plant material.

All trees and a representative sample of each shrub species on the Plant List shall be tagged by the Contractor at the nursery and approved by the Engineer or his representative, prior to digging, for conformity to specification requirements as to quality, size, and variety. Cost of replacement of materials rejected by the Engineer at the site shall be borne by the Contractor.

Approval of tagged material at the nursery shall not prevent the right of inspection and rejection upon delivery at the site or during the progress of the work.

Tree trunks shall be protected during shipping by a heavy walled cardboard sleeve or other suitable material. Plants shall either be shipped in enclosed trucks or all surfaces, leaves and branches shall be wrapped to prevent damage.

Plant Delivery and Installation

Locations for all plants shall be approved by the Engineer before any plant pits or plant beds are excavated.

The Contractor shall locate all underground utilities within 10 feet of the proposed planting pits and notify the Engineer of any conflicts prior to digging plant pits.

The Contractor shall notify the Engineer 3 working days prior to the proposed arrival of plant material on the site. All plants shall be planted within 5 days of arrival on site or shall be rejected by the Engineer. Plants stored on site shall be shaded from direct sunlight at all times and shall not be stored on paved surfaces. Plants stored on site shall be watered daily.

Planting

Prior to the installation of any plant material, the Contractor shall dig test pits to determine percolation rates. Percolation of less than 1-inch per hour shall require corrective measures as recommended by the Contractor and approved by the Engineer.

Plant pits shall be excavated as shown on plans and the sides scarified to prevent glazed soils.

Trees and shrubs shall be placed as shown on the plans, with the root crown exposed above finished grade. After placement of balled and burlapped plants and prior to backfilling, remove all rope, wire baskets and burlap from the root balls. For container material, remove pots just before planting, and loosen the perimeter roots and soil before placement. Handle plants carefully to prevent damaging roots or stems.

Add soil wetting agent and mycorrhizal fungi per manufacturer specifications. After planting, the Contractor shall submit wetting agent and fungi dose packets to the Engineer to certify installation of material.

Prepare planting soil mix as specified above to depths as shown on the drawings. Place backfill mix in layers of not more than 6-inches, and water each layer sufficiently to settle soil before the next layer is put in place. Backfill mix shall meet finished grade after settlement. Shape edge of planting pit to form a saucer for holding water and place mulch as shown in the plans. Do not cover the stem flare of the plants with mulch.

Water plants immediately following planting as necessary to thoroughly moisten rootball and planting soil.

Plants shall not be wrapped after installation. Wounds shall not be painted. Trees shall not be staked unless wind or other local conditions require the additional protection. Staking and guying shall be as required and shall be incidental to tree installation. If guying is required, use cloth tape rather than wire. The Contractor shall be responsible for removing all staking and guying materials at the end of the Maintenance Period.

Daffodils shall be placed at depths per manufacturer's directions. Bulbs shall be planted with narrow tip end pointing up. All bulbs shall be planted in groups of at least 4 plants and shall be in a random pattern unless otherwise noted on plans. Bulbs shall be installed in the fall.

Plant Care

Contractor shall provide plant care for the duration of the Maintenance and Establishment periods.

Adequate watering is essential to plant care. During the 60 day Maintenance Period, plants shall be inspected for watering needs at least twice each week using moisture meters supplied by the Contractor. In addition, during the portion of the Establishment period occurring between May 1 and October 1, the plants shall be inspected weekly using moisture meters.

Plant care shall consist of keeping the plants in a healthy growing condition. Plant care shall include watering, weeding, pruning, re-mulching, removal of dead material, resetting plants to proper grades or upright position, and maintaining the planting saucer.

Trees and shrubs shall be pruned, if necessary, following planting and in accordance with the American Nurserymen's Association Standards for Class I, fine pruning, to preserve the natural character of the plant. All dead wood or suckers and all broken or badly bruised branches shall be removed. Do not cut leaders. The Engineer shall determine if plants require pruning, or should be rejected. All pruning work shall be done by a Massachusetts Certified Arborist.

Any decline in the condition of new plantings shall require the Contractor to take immediate action to identify potential problems and undertake corrective measures. If required, the Contractor shall engage professional arborists and/or horticulturists to inspect plant materials and to identify problems and recommend corrective procedures. The Engineer shall be immediately advised of such actions. Inspection and recommendation reports shall be submitted to the Engineer.

Absolutely no debris may be left on the site. The Contractor shall repair any damage to site as required by the Engineer, at no additional cost.

Maintenance Period: 60 Days

The Maintenance Period shall begin immediately after each plant is planted and shall continue for a minimum of 60 days following the completion of all planting installations, or until the Conditional Acceptance of all planting work, whichever is a longer period of time.

At the end of the Maintenance Period, the Contractor will request inspection by the Engineer at least 10 days before the anticipated date of inspection.

At the time of inspection, if the plant materials and workmanship are acceptable to the Engineer, the Engineer shall issue a written Certificate of Conditional Acceptance to the Contractor. The date of the inspection shall establish the end of the Maintenance Period and the commencement of the required one year establishment period for planting work.

If in the Engineer's opinion, plant materials and/or workmanship is deficient, acceptance will not be granted, and the Maintenance Period for all the plants shall be extended until plant replacements are made or other deficiencies are corrected. All dead and unsatisfactory plants shall be removed promptly from the project. Replacement plants shall conform in all respects to the Specifications for the original plants and shall be planted in the same manner.

Establishment Period: One Year

The purpose of the Establishment Period is to nurture plants through at least one full growing season and one full winter. All plants shall be inspected by the Engineer one year after Conditional Acceptance and shall be alive and in satisfactory growth at the end of that time. The Contractor is responsible for arranging inspection early enough in the season to allow adequate time to procure and install replacement material.

At the end of the Establishment Period, each plant shall show healthy growth on at least 75 percent of its terminal stems, as determined by the Engineer. Determination of healthy growth shall include, but is not necessarily limited to, viable leaves (in season) and terminal buds, as well as live cambium. Plants found to be unacceptable shall be removed promptly from the site and replaced immediately or during the next normal planting season, as permitted by the specifications.

Planted areas shall be free of weeds and debris, and plantings shall be re-mulched as necessary.

The Engineer will inspect the replacement planting work upon the request of the Contractor. Request for inspection shall be received by the Engineer at least ten days before the anticipated date of inspection.

Stakes and guying, if any, shall be removed from all plants before Final Acceptance.

Upon acceptance of the work of replacement planting, the Engineer shall issue a written Certificate of Final Acceptance for all plants installed under this Section to the Contractor.

MEASUREMENT AND PAYMENT

ITEMS listed above will be measured PER EACH. Payment will not be approved until satisfactory completion of the Maintenance Period. The Contract unit prices paid shall be full compensation for providing materials, equipment, labor, and incidentals to provide plant pit excavation, soil preparation, soil amendments, planting mix preparation, loam for planting mix, soil wetting agents, mycorrhizal fungi planting, plant protection, bark mulch (including placement), watering, maintenance, disposal of unsuitable soils, and all other incidentals required for furnishing and installing the plantings in accordance with the drawings, and as required by the Engineer.

ITEM 813.81 **SERVICE CONNECTION (UNDERGROUND)** **EACH**

The work under this item shall conform to the relevant provision of Section 813 of the Standard Specifications and the following:

Service connections shown on the plans are approximate only. The Contractor shall determine exact locations from the servicing utility, arrange to complete the service connections, and be responsible for all charges incidental thereto.

A 100-ampere meter socket approved by the servicing utility company shall be furnished and installed at a location determined by the City that will be installed by the serving utility company.

Item 813.81 will be measured and paid for at the contract unit price per each, which price shall include all labor, materials, excavation, backfill, compaction and finishing, along with all necessary components including (but not limited to) conduit riser, conduit from power source to load center, wire from power source to load center, labor, tools and incidental costs required to complete the work. The cost of meeting with and coordinating with the utility company is also incidental to this item.

ITEM 815.1 TRAFFIC CONTROL SIGNAL – SUMMER STREET LUMP SUM

The work under this item shall be in accordance with the provisions of Section 800 and 900 of the STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, THE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES WITH THE LATEST REVISIONS AND THE LATEST DETAIL STANDARD DRAWINGS FOR TYPE II MAST ARM AND FOUNDATION and the following Special Provisions. The work for these items shall be performed as follows:

The work to be done under this item consists of the installation of new traffic signal equipment as shown on the plans. The equipment to be furnished and installed at the intersections listed below includes vehicle detectors, signal posts, signal heads, and foundations, pull boxes, conduit, wire and cable, an emergency preemption system and all other equipment, materials and incidental materials and costs necessary to furnish, install and program a complete and functioning traffic control system as specified and as shown in the contract documents.

All uprights, cabinets and other above ground signal equipment shall be finished black with polyester powder paint applied after a seven stage pretreatment process to ensure maximum durability.

The intersection location identified on the plans: Cedar Street @ Summer Street

A list of major items and/or work required is included on the contract plans.

SERVICE CONNECTIONS

Service connections shown on the plans are approximate only. The Contractor shall determine exact locations from the servicing utility, arrange to complete the service connections, and be responsible for all charges incidental thereto.

A 100-ampere meter socket approved by the servicing utility company shall be furnished and installed on the side of the control cabinet by the serving utility company.

A 3-inch PVC Conduit shall be installed from the controller cabinet to the utility pole, or manhole, which will supply electrical service to the controller cabinet. This conduit shall be encased in concrete where crossing roadways and/or driveways.

FLASHING OPERATION

Changes from automatic flashing to stop-and-go operation and from stop-and-go to automatic flashing operation shall occur as set forth in Section 4D-12 of the MUTCD.

TRAFFIC SIGNAL EQUIPMENT

The traffic signal controller unit (CU), malfunction management unit (MMU) and all other ancillary traffic signal control components included in the traffic control cabinet shall comply with the National Electrical Manufacturers Association (NEMA) Standard No. TS 2-1998, Traffic Controller Assemblies with National Transportation Communications for ITS Protocol (NTCIP) Requirements.

TRAFFIC SIGNAL CONTROLLER

Controllers shall conform to Section 3, "Controller Units" of NEMA TS 2, "Traffic Controller Assemblies". The controller unit shall meet all applicable requirements of the NEMA Standard Publication No. TS 1 and the MassDOT Standard Specifications. The controllers should be supplied in a TS 2 Type 1 configuration as required in the list of major traffic signal items included on the plans. Controllers shall utilize an input/output interface conforming to Section 3.3.1 of the NEMA TS 2 Standard for all input/output functions with the backpanel terminals and facilities, the malfunction management unit, detector rack assemblies and auxiliary devices.

The controller shall utilize an interface conforming to Subsection 3.3 of the NEMA TS 2 Standard. The controller unit shall utilize an input/output interface conforming to the requirements of part of Paragraph 3.3.1 for all input/output functions with the Malfunction Management Unit (MMU) and Paragraph 3.3.5 for input/output functions with the Terminal Facilities (TF) and auxiliary devices.

The controller unit shall be a keyboard-entry menu-driven unit and conform to the Standard Specifications, with internal time base coordination, emergency preemption, and programmatic capability. The controller shall be complete with a module, including modem card and physical connector, to support closed loop communication.

MALFUNCTION MANAGEMENT UNITS

The malfunction management units (MMU) shall comply with Section 4 of the NEMA TS 2 standard. The MMU shall be capable of operating as either a Type 16 with 16 channels (8 vehicle, 4 pedestrian, 4 overlap) or a Type 12 with 12 channels (8 vehicle, 4 overlap). The MMU's supplied shall be configured to operate as Type 16 units.

The MMU's in either the Type 16 or Type 12 configuration shall be capable of operating in a NEMA TS 2 Type 2 cabinet, a NEMA TS 2 Type 1 cabinet, or a NEMA TS 1 cabinet without loss of functionality. The MMU shall be connected directly to the controller unit to support enhanced MMU monitoring of controller operations.

BUS INTERFACE UNIT

The Controller Cabinet will be equipped with a Bus Interface Unit (BIU). The BIU shall comply with Section 8 of the NEMA TS 2 Standard.

The BIU shall be fully interchangeable with any other manufacturer's unit and interchangeable in a NEMA TS 2 Type 1 cabinet assembly.

The BIU shall perform the interface function port 1 at the controller unit, the malfunction management unit, the loop detector rack assembly and the backpanel terminal and facilities.

At a minimum, two LED indicators shall be provided on the BIU front panel. One indicator shall serve a dual use; as a power on indication and as a diagnostic indicator for proper operation of the device. The second indicator shall serve as a transmit indicator illuminating each time data is transmitted.

The controller cabinet shall include a minimum of two (2) spare BIU's.

LOOP DETECTION

Wire loop detectors shall be installed in the roadway for vehicle detection. In advance of the loop detector installation, the Contractor shall mark, on site, the loop detectors with any changes required by field conditions such as manholes. The loop detector layout shall be inspected and approved by the Engineer before the loop detectors are installed.

Loop wire shall be encased in a protected plastic tubing of PVC or polyethylene plastic, IMSA 51-5,0.25 inch outside diameter, and the wire may have cross-linked polyethylene insulation or it may have THHN/THWN insulation.

Splicing insulator shall be an approved re-enterable rigid body splice kit with a non-hardening sealing compound compatible with the wire insulation.

Splice and Connection: Splicing and connection shall be made in the pull box nearest the roadway loop sensor but not exceeding four loops per pull box. All loops included in a detector group as shown on the plans shall be spliced in a single pull box. Each lead and lead-in connector shall be stripped back and spliced using a pressure type wire connector applied with a crimping tool. Multiple loop sensors shall be identified as detailed on the plans.

Lead-in splicing shall be staggered to prevent contact with each other. Each crimped splice shall be soldered and insulated. The insulation material shall be heat-shrunked polyolefin. The shielded lead-in cable outer jacket and shield shall be stripped back sufficiently to ensure that the shield cannot come into contact with the spliced conductors. Follow the instructions of the kit manufacturer for this procedure when installing the re-enterable splice kit.

NOTE WELL: The above splice shall be done on the day of the loop wire installation to prevent the entrance of any moisture into the plastic tubing.

The lead-in conductors shall be connected to the appropriate terminals in the controller cabinet, by using crimped or soldered terminal ends. The heat source for soldering shall be electrical not exceeding 30W capacity.

Testing of Loops: The following test procedure shall be performed in the presence of the Engineer and a representative from the City of Somerville wiring before and after the loop sensor is sealed in the pavement as detailed below. The cost of equipment, labor, and materials to perform such testing and similar re-testing following repairs, replacement, or adjustment of any detector within the project area shall be included in the contract unit price for this Item.

After installation of wire loop sensors in the roadway and installation of shielded lead-in connecting the loop sensors to the controller cabinet, each loop sensor and lead-in combination shall be tested (at the controller cabinet) for proper installation. The resistance from lead to lead of the same loop shall not exceed three (3) ohms per one thousand (1000) feet as measured by a high quality meter suitable for measurements of low resistance in the range of 1 to 6 ohms.

A megohm meter test at 500 volts DC shall be made between the two leads of a loop/lead-in combination temporarily spliced together, but otherwise disconnected from all terminals, and the shield drain wire and the earth ground connection. These resistances shall be at least one hundred (100) megohms.

A megohm meter test at 500 volts DC shall be made between lead-in shield and the earth ground rod. This resistance shall be at least one hundred (100) megohms.

The meter used for these tests shall be checked for calibration each day of use by using a resistor block of $\pm 5\%$ resistors simulating loads of 1 megohm, 20 megohm and 100 megohms. The observed meter reading shall be $\pm 10\%$ of the nominal resistor load.

If any loop sensor and lead-in combination fails to pass any one of the four (4) tests, it shall be repaired and then re-tested on two occasions at least two (2) weeks apart and then shall pass on each re-test occasion. If the loop sensor lead-in combination does not pass all these re-tests, a new loop sensor and/or lead-in shall be installed, and shall pass these tests, at no additional cost.

After the above tests have been satisfactorily completed, all loop sensor/shielded lead-in inductance shall be measured and a written report of the results shall be filed with the Engineer and a copy stored with the "box prints" at the intersection.

LOAD SWITCHES

Load switches shall comply with Subsection 6.2 of the NEMA TS 2 Standard. All load switches shall utilize optically isolated encapsulated modular solid-state relays. Discrete components on circuit boards are not acceptable.

Load switch indicator lights shall be LED-type and wired on the input side of the device.

Note: The controller cabinet assembly shall be initially supplied with a full complement of load switches to accommodate each available position of the backpanel.

FLASHER

Flashers shall comply with Subsection 6.3 of the NEMA TS 2 Standard and be equipped with two output indicator lights which will show flashing power out to the cabinet assembly.

FLASH TRANSFER RELAYS

Flash transfer relays shall comply with Subsection 6.4 of the NEMA TS 2 Standard.

The field electrical loading for flash operation shall be wired through the transfer relays such that the load on the 2-circuit flasher is as balanced as possible within the limitations of the signal phasing.

Note: The controller cabinet assembly shall be initially supplied with a full compliment of flash transfer relays to accommodate each available position of the backpanel.

TRAFFIC CONTROLLER CABINET

The controller cabinets shall conform to the NEMA TS 2 Type 1 Standards, Section 7. Cabinet size shall be as indicated on the plans and as shown below. It should be noted that approximate cabinet dimensions are in inches.

<u>Item Number</u>	<u>NEMA TS 2 Cabinet Type</u>	<u>Cabinet Size (Nominal) (HxWxD*)</u>	<u>Back Panel</u>	<u>Mounting</u>	<u>Malfunction Management Unit</u>
-	6	52x44x28	12-Position	Ground	16 Channel

* Approximate cabinet dimensions are provided in inches.

Note: The control cabinet shall be initially wired with a “D” harness. All wires for this harness shall be properly terminated on the back panel.

The cabinet shall also be wired with a normally closed switch connected to a user defined input to the controller for remote monitoring of the control cabinets’ door open status.

The following requirements are applicable to each signalized location and are designed for effective use of a laptop computer in conjunction with traffic signal controllers. These requirements are also designed to permit all engineers, electricians and technicians (including those who are disabled but ambulatory) to work in the cabinet in a safe, effective and comfortable manner. To this extent, the following meets applicable ADA requirements.

1. Adjust the control cabinet height by use of a cabinet extender, adjust the placement of cabinet shelves, adjust the height of the cabinet foundation or provide any combination of these three items so that the top of the LCD or other visual display window of both the local controller and the master controller is no more than 48-inches above finished grade in front of the cabinet. The top of the cabinet door opening shall be at least 5-feet 8-inches above finished grade. Any technical provision, plan detail, standard specification or standard drawing to the contrary shall not apply to the extent that it may conflict with this viewing height requirement.
2. Furnish and install one slide-out/slide-in shelf or swing-out/swing-in shelf appropriate for the size and load of a laptop computer. This moveable shelf shall support the bottom of the laptop computer at a height between 3-feet 4-inches and 3-feet 8-inches above finished grade in front of the cabinet.
3. Furnish and install a paved pad in front of the control cabinet. This pad may be of bituminous concrete or cement concrete, built in accordance with the sidewalk specification applicable to this project, approximately level, approximately 1-inch above the surrounding unpaved surface, or at even grade with the adjacent surface if paved. This pad shall abut the front of the cabinet, and project at least 1-foot to each side of the cabinet and at least 3-feet in front. No pad is required if the front of the cabinet immediately abuts an existing or proposed paved sidewalk or other paved surface.
4. Both the firmware and software version in each timer unit shall be the same throughout the project, and shall be the latest version available on the market. In addition, the Contractor shall promptly furnish to the Owner and install all upgraded versions of both firmware and software through the last day of the inspection period, guarantee period or warranty period, whichever date is later.
5. The Contractor shall furnish one cable with each new timer unit to connect a controller timing mechanism to a laptop computer. This cable shall have a termination at one end to match the controller. It shall have a termination on the other end to match the type of serial port found on laptop computers, usually DB9. This cable shall be wired to provide serial RS232C communication between the controller and the computer.
6. Payment for the work described above shall be deemed to be incidental to and included in the prices bid for various items of traffic signal work, and no additional payment shall be made for the work described above.

BACKPLATES

Louvered backplates shall be provided on all signal heads as noted on the plans. The top, bottom and sides of all backplates shall measure from five to six inches in width. No louvers shall be closer than ½-inch from the inner edge of the backplate panel. Louver orientation shall be vertical on sides and horizontal on top and bottom.

Backplates shall have a dull black finish on the side oriented with the signal face. The back side of the backplate shall match the color of the signal housing.

Retro reflective borders shall be provided on all backplates. The borders shall be constructed from a 2-inch yellow retro reflective adhesive sheeting border on the entire outer perimeter of the backplate panels. Retro reflective sheeting type shall be yellow, Type III or Type IV. The retro reflective border shall be placed no closer than ½-inch from all louvers. No sheeting is allowed over any louvered areas.

PEDESTRIAN SIGNAL HEADS, INDICATIONS AND APPURTENANCES

General Description

The Audible-Tactile Pedestrian Signal System shall consist of all electronic control equipment, mounting hardware, pushbuttons and signs, which are designed to provide both a pushbutton with a raised vibrating tactile arrow on the button, along with a variety of audible sounds for different pedestrian signal functions.

Design Compliance

1. The system shall meet the functionality requirements of MUTCD 2009-CAMUTCD 2011-4E.
2. The system shall meet NEMA TS 2 Section 2.1 Temperature and Humidity (salt-fog) requirements.
3. The system shall meet NEMA TS 2 Section 2.1 Transient voltage Protection requirements.
4. The system shall meet NEMA TS 2 Section 2.1 Mechanical Shock and Vibration requirements.
5. The system shall meet IEC 61000-4-4, IEC 61000-4-5 Transient Suppression requirements.
6. The system shall meet FCC Title 47, Part 15, Class A Electronic Noise requirements.
7. The Push Button Station (PBS) Enclosure shall meet NEMA 250 – Type 4X Enclosure requirements.
8. The system shall meet NEMA TS 4 – electric Reliability requirements (applicable portions of Section 8)

Functional Requirements

1. The system shall be able to set to vibrate a tactile arrow button during the WALK interval following a button push and/or every time the walk comes up.
2. The system shall have the field-selectable function known as “Locating Tone”. This means that during the FLASHING DON’T WALK and the DON’T WALK intervals, the systems shall provide a locating tone that emanates from Pedestrian Push Button Station. The system shall provide at least three different sounds to choose from.
3. The system shall have the field selectable function known as “Extended Push Activation”. Defined as audible WALK message shall only be activated and audible during WALK interval if the pedestrian call button is depressed continually beyond a field selectable minimum period of time (from .5 seconds to 6 seconds). Also, for the following walk phase, the volumes will be increased to play at a settable minimum volume level.
4. The system shall have the field selectable function known as “Informational Message”. This means that a custom message giving the location of the street to cross and the

- intersection (or other information) will be localized only when the button is depressed for a minimum field selectable time.
5. The APS shall provide a “Wait” message that plays once the button is activated and repeats until the walk cycle initiates. This message must have the field selectable option of OFF or repeating every 4, 6, 8, or 10 second intervals.
 6. The system shall have standard “Travel Direction” options that can be selected at the time of installation with either a vendor supplied wireless hand-held Configurator device or Windows XP/7 PC-based Laptop software program.
 7. The system shall have at least five field selectable WALK sound options including a cuckoo, a chirp, a MUTCD rapid tick or user-defined custom voice message.
 8. The system shall provide three pedestrian-clearance sound choices including audible countdown (field selectable). The audible countdown shall represent the time remaining during the pedestrian clearance interval. Timing is automatically adjusted to CLEARANCE INTERVAL timing red from traffic controller associated pedestrian phase output.
 9. LOCATE tone and “Walk”, “Pedestrian Clearance” audible features shall have independent assignable minimum and maximum volume limits.
 10. The system shall utilize an interval ambient sensing microphone located within the pedestrian pushbutton (PPB) station in a non-visible, environmentally protected housing.
 11. All sound levels shall adjust automatically via the interval PPB audible feedback microphone; in response to ambient noise measurements over 60 dB range with additional software-based volume control to adjust the sound level at ambient, 5dB or 10 dB over ambient, to a maximum of 100dB.
 12. The system shall have an independent ambient adjustment setting for the locate tone that allows the locate tone volume to be set to play below the ambient noise level.
 13. The APS shall utilize high quality digital audio technology, utilizing a minimum 12-bit sample at a 16 Hz sample rate. The audio amplifier must have total harmonic distortion (THD) of less than 3% at 75dB.
 14. The firmware and voice messages shall be upgradable via a PC standard USB port at the PBS. There shall be no requirement for the IC chips or module hardware to be removed or exchanged in order to complete a firmware update.
 15. Use of field replaceable fuses is unacceptable. All fuses and overload protection circuits shall be solid state, and self-resetting in the event of overload.
 16. All field selectable options shall be set and adjusted using vendor supplied infrared remote programmer or Laptop USB port, without use of potentiometer or hardware adjustments. All USB adjustments shall include a Windows XP/7/Vista PC-based program with password security.
 17. The system shall work with the vendor windows XP/7/Vista PC-based program to allow time of day (TOD), week, month and holiday programming, with a minimum of 4 TOD alternate programs.
 18. The system shall have an event tracking log, accessible via the vendor’s Windows XP/7/Vista PC-based program, to allow downloading of the time stamped event data.
 19. The system shall operate with the vendor’s Windows XP/7/Vista PC-based software program to record and upload cumulative pedestrian count and call data.

TESTING OF GROUNDING SYSTEM

The Contractor shall perform testing of the equipment grounding system in the presence of the Engineer in accordance with the Standard Specifications.

EMERGENCY VEHICLE PREEMPTION

The emergency vehicle preemption control system shall consist of a data-encoded phase selector to be installed within the traffic control cabinet. This unit will serve to validate, identify, classify and record the signal from the optical detectors located on support structures at the intersection. Upon receiving a valid signal from the detector, the phase selector shall generate a preempt call to the controller initiating a preemption operation as shown on the plans.

The optical detectors shall be single input, single output units used to control one approach.

The phase selector shall be a rack-mounted plug-in four channel, dual priority device. The phase selector shall plug into a shelf-mounted single card slot chassis. Programming the phase selector shall be via a PC-based computer utilizing unit specific software. One copy of software, on 8cm or 12cm CD shall be supplied and licensed to the City of Somerville. A hard copy of final programming data shall be left in the control cabinet. The CONTRACTOR shall supply a complete set of interface cables for phase selector to laptop connection.

The CONTRACTOR shall install a confirmation strobe at the traffic signal location as shown on the plans. The confirmation strobe shall serve to validate to the driver of the emergency vehicle that the traffic signal has recognized the preemption call and will initiate the proper preemption sequence. The confirmation strobe shall be a white lens.

The CONTRACTOR shall be responsible for the proper programming of the phase selector, orientation of the optical detectors, and all other work necessary to provide a complete and operating emergency vehicle preemption system. The CONTRACTOR may be required to field adjust the location of the optical detectors in the presence of the Engineer and the City of Somerville Department of Public Works Engineering Division to properly detect preemption calls from approaching vehicles.

SIGNAL POLES AND FOUNDATIONS

Signal poles and foundations shall be fabricated and constructed in conformance with the plans.

Signal poles shall be Type 2 Black Painted Steel with shoe bases.

Signal pole foundations, the standard signal pole foundation shall be modified to a concrete cored foundation.

Signal pole foundations shall not obstruct a sidewalk or crosswalk so that passage by physically challenged persons is not impaired.

POSTS AND BASES

Signal posts and bases shall be in accordance with MassDOT Standards.

SIGNAL HEADS

Signal heads shall be rigid mounted on mast arms, with the bottom of all signals at the same height. All traffic signal lenses shall be 12-inches in diameter unless otherwise noted on the plans. Louvered backplates shall be 5-inches provided on all signal heads as noted on the plans. All signal heads shall be equipped with light emitting diode (L.E.D.) 12" modules as noted on the plans.

Signal heads shall be made of aluminum. Signal heads shall be painted black in accordance with MassDOT standards with cut tunnel visors unless otherwise noted on the major items list on the plans.

Red, Yellow, and Green LED Vehicle Signal Modules

Any equipment that has been type-tested and approved according to section 815.21 of the Standard Specifications prior to the date of award of this contract will be considered as meeting these specifications.

All Red, Yellow and Green LED signal housings with the exception of optically-programmed and fiberoptic housings shall conform to the following:

All Red and Green LED signal modules shall conform to "Interim LED Purchase Specification of the Institute of Transportation Engineers, Vehicle Traffic Control Signal Heads – Part 2: Light Emitting Diode (LED) Vehicle Traffic Signal Modules", July 1998, or most current version, Institute of Transportation Engineers (ITE), 525 School Street, SW, Suite 410, Washington, DC, 20024-2797.

Yellow LED signal modules shall conform to the above specifications with the exception that yellow modules shall meet maintained Minimum Luminous Intensity values of Table 1, Section 4 of the above referenced ITE specification of compliant green signal modules at 25oC at 120 volts AC, throughout the useful life based on normal use in traffic signal operation over the operating temperature range.

All signal modules shall conform to the following: (in the case of a conflict, the following special provision shall overrule.)

An independent laboratory shall certify that the LED signal module complies with Section 6 Quality Assurance of the above stated ITE LED Purchase Specification.

LED signal modules must be type-tested and approved by MassDOT according to the requirements of Subsection 815.21 of the Standard Specifications for Highways and Bridges.

On the backside of the LED module there shall be a permanently marked “up” arrow to aid in the proper orientation of the module during installation.

The manufacturer’s name, trademark, serial number and other necessary identification shall be permanently marked on the backside of the LED signal module.

Physical and Mechanical Requirement

LED signal modules shall fit without modifications into existing traffic signal housings conforming to “Vehicle Traffic Control Signal Heads (VTCSH) published in the Equipment and Materials Standards of the Institute of Transportation Engineers. The LED signal module shall be a single, self-contained device, not requiring on-site assembly for installation. The LED signal assembly shall conform to the applicable ASTM specifications for the materials used to fabricate the module.

Each red LED signal module shall be comprised of a smooth surfaced Red, UV stabilized polycarbonate outer shell, multiple LED light sources, a power supply and a polycarbonate back cover assembled in a gasketed or silicon sealed unit.

Each yellow LED signal module shall be comprised of a smooth surfaced Yellow, UV stabilized polycarbonate outer shell, multiple LED light sources, a power supply and a polycarbonate back cover assembled in a gasketed or silicon sealed unit.

Each green LED signal module shall be comprised of a smooth surfaced Green, UV stabilized polycarbonate outer shell, multiple LED light sources, a power supply and a polycarbonate back cover assembled in a gasketed or silicon sealed unit.

Optical and Light Output Requirements

The minimum luminous intensity values and light output shall be maintained within the rated input voltage of 117 Volts AC. Red and Green LED signal modules shall not be allowed to fall short of the minimum intensity values of any of the 44 measuring points of the standard when the lamp is turned on cold for measurements and after a 30 minute warm-up time period at 100% duty cycle. Yellow LED signal modules shall not be allowed to fall short of the minimum intensity values for green modules as described above, at any of the 44 measuring points of the standard.

Electrical

The maximum wattage for red and green 12-inch balls shall be 20 Watts and 10 Watts for the 12-inch red and green arrows. The maximum wattage for 12-inch yellow balls shall be 24 Watts and 12 Watts for the 12-inch yellow arrows.

The LED sources shall not be powered above 70% of the manufacturer’s specified rate load. This shall be clearly shown in laymen’s terms through calculations, schematics, catalog cuts, etc.

Red LED sources shall be AlInGaP (Aluminum Indium Gallium Phosphide) type shown clearly in a catalog cut or similar literature.

Yellow LED sources shall be AlInGaP (Aluminum Indium Gallium Phosphide) type shown clearly in a catalog cut or similar literature.

Green LED sources shall be InGaN (Indium Gallium Nitride) type shown clearly in a catalog cut or similar literature.

Warranty

The LED signal module will be replaced or repaired by the manufacturer if it exhibits a failure due to workmanship or material defects within the first 60 months of field operation.

The LED signal module will be replaced or repaired by the manufacturer if it exhibits either a greater than 40 percent light output degradation or a fall below the minimum intensity levels within the first 36 months of field operation.

SOFTWARE

All local controller, malfunction management unit, loop detector amplifier and emergency vehicle preemption software shall be supplied with the latest available revision. Any software upgrades released by the manufacturer shall be supplied at no charge to the City of Somerville for a period of five years after acceptance of the traffic signal installation.

DOCUMENTATION

Each programmable local hardware component (i.e. controller, malfunction management unit, loop detector amplifier, emergency vehicle preemption phase selector) shall be initially programmed by the Contractor based on information contained on the plans. Note: Three bound sets of hard copy programming per device shall be supplied to the City of Somerville by the CONTRACTOR.

Upon final acceptance of the signal by the CITY, the CONTRACTOR shall supply two (2) 8½"x11" or 11"x17" laminated copies of the final traffic signal design plan and sequence and timing chart. One to be given to the City of Somerville Transportation Director and one to be left in the cabinet documentation envelope mounted on the inside of the cabinet door.

MAINTENANCE OF TRAFFIC SIGNALS

It shall be the responsibility of the Contractor to provide all labor, equipment and material required for the maintenance of full repair of all temporary and proposed traffic control equipment within the project limits, including damage by automobile accident. The maintenance responsibility shall commence from the date the Contractor begins work on or near an existing signal and shall continue until the date when the Engineer recommends acceptance of the completed job.

For the purposes of these paragraphs, the phrase "Traffic Signal Control Equipment" is intended to include, but is not limited to: controllers, detectors, signal housings, supporting structures, cabinets, wires, conduit and all other ancillary electrical equipment used for traffic control.

TRAFFIC CONTROL EQUIPMENT REMOVED AND STACKED

The removal and stacking of the existing equipment marked on the plans shall conform to the relevant provisions of Subsection 815.65 and the following:

The Contractor shall remove the existing traffic signal control equipment indicated on the plans and stack for transport by Contractor's forces to the City of Somerville Department of Public Works Yard.

All traffic signal equipment shall remain the property of the City unless the Contractor is notified in writing by the Engineer to dispose of specific items. Disposal of existing equipment shall be specified in the Standard Specifications.

FINAL INSPECTION

The Contractor shall arrange for a final inspection of the signal system once the 30 day fine tuning and adjustment period is completed. At a minimum, representatives from the Contractor, the Design Engineer and the City shall be present.

COMPENSATION

Payment for all work required under this section shall be included in the LUMP SUM bid price for the project which shall include all labor, materials, equipment and any incidental cost required to complete the work with no additional compensation provided.

ITEM 868.041	PAVEMENT ARROWS AND LEGENDS	SQUARE FOOT
	<u>REFL. WHITE (EPOXY)</u>	
ITEM 868.04	4 INCH REFLECTORIZED WHITE LINE (EPOXY)	FEET
ITEM 868.06	6 INCH REFLECTORIZED WHITE LINE (EPOXY)	FEET
ITEM 868.12	12 INCH REFLECTORIZED WHITE LINE (EPOXY)	FEET
ITEM 868.3	BICYCLE SYMBOL WHITE (EPOXY)	SQUARE FEET
ITEM 869.06	6 INCH REFLECTORIZED YELLOW LINE (EPOXY)	FEET
ITEM 869.1	GREEN PAINT FOR BIKE LANES (EPOXY)	SQUARE FEET

The work under these items shall conform to the relevant provisions of Section 860 of the Standard Specifications and the following:

Item 868.04, 868.06, 868.12, 869.06 will be measured for payment by the linear foot of actual markings installed, which price shall include all labor, materials, equipment, and incidental costs required to complete the work.

Item 868.041, 868.3 and 869.1 will be measured for payment by the square foot of actual markings installed, which price shall include all labor, materials, equipment, and incidental costs required to complete the work.

ITEM 874.2	TRAFFIC SIGN REMOVED AND RESET	EACH
ITEM 874.21	MISC TRAFFIC SIGN REMOVED AND RESET	EACH

The work under these items shall conform to the relevant provisions of the Standard Specifications and the following:

The contractor shall take all necessary precautions not to damage any of the signs during the removal process. Any signs damaged beyond use shall be replaced by the Contractor at no cost to the City of Somerville.

All signs removed and stacked shall be delivered to the Somerville Department of Public Works Yard, Somerville, MA 02038, at no additional cost.

All signs shall be reset as required by the engineer at no additional cost.

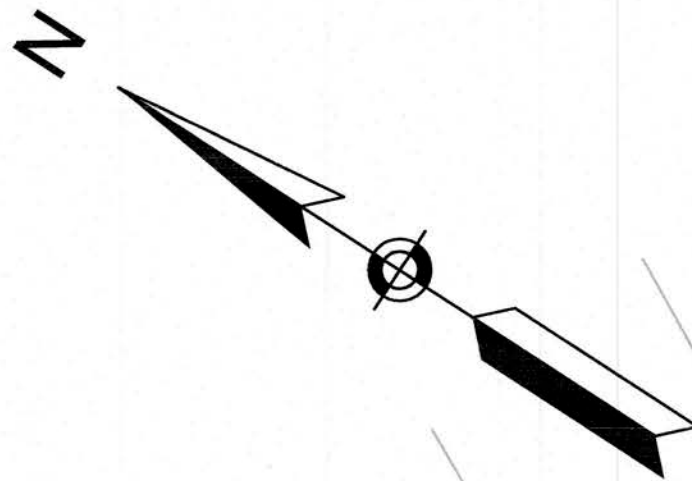
Basis of Payment

Work under this Item shall be paid at the Contractor bid price, per each unit, which payment shall be considered compensation for all labor, tools, equipment and materials needed to do the work as described above.

Addendum No. 3 to IFB 16-48

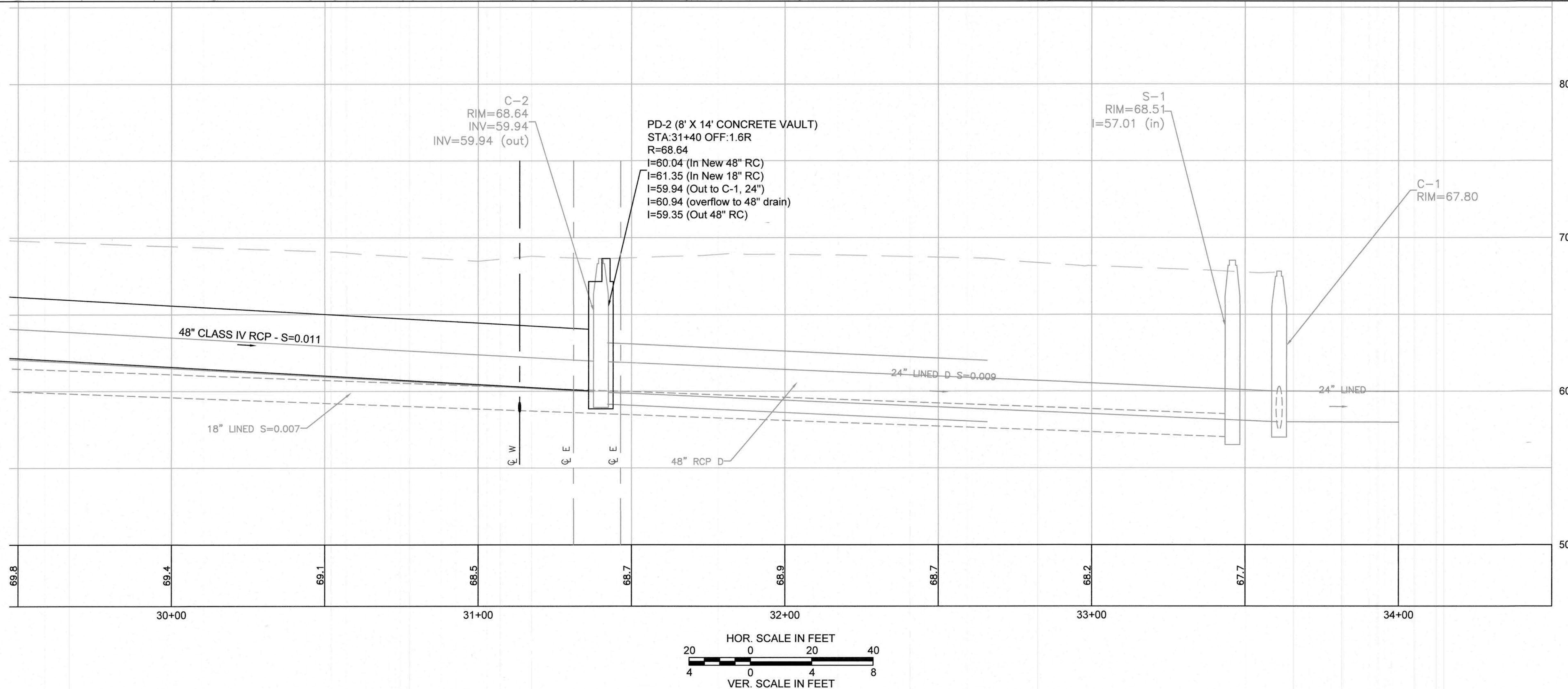
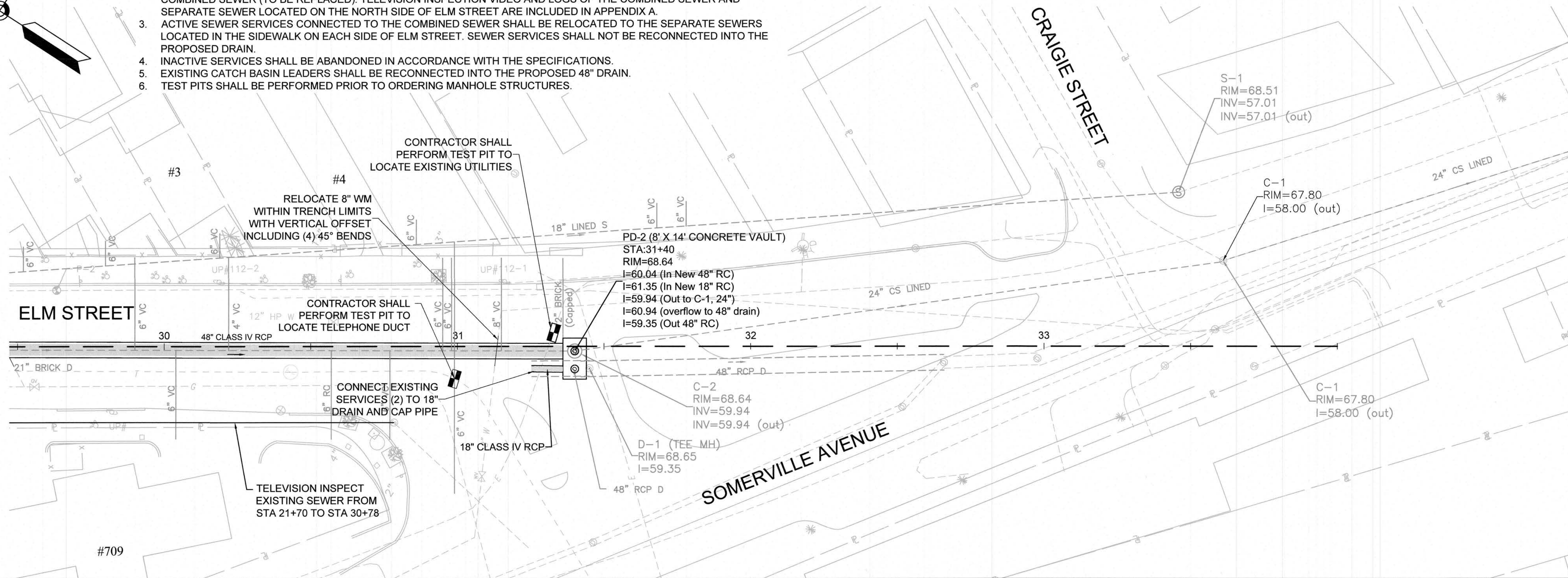
Attachment 3
Select, Revised Drawings

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- NOTES:
1. PRIOR TO INSTALLATION OF 48" DRAIN CONTRACTOR SHALL VERIFY ALL ACTIVE SERVICE CONNECTION LOCATIONS IN THE COMBINED SEWER AND SEPARATE SEWERS (2) THROUGH TELEVISION INSPECTION AND DYE TESTING.
 2. PRIOR TO INSTALLATION OF 48" DRAIN CONTRACTOR SHALL TELEVISION INSPECT THE SEPARATE SEWER LOCATED IN THE SOUTH SIDEWALK TO DETERMINE WHETHER THE BUILDINGS ARE CONNECTED TO THE SEPARATE SEWER OR THE COMBINED SEWER (TO BE REPLACED). TELEVISION INSPECTION VIDEO AND LOGS OF THE COMBINED SEWER AND SEPARATE SEWER LOCATED ON THE NORTH SIDE OF ELM STREET ARE INCLUDED IN APPENDIX A.
 3. ACTIVE SEWER SERVICES CONNECTED TO THE COMBINED SEWER SHALL BE RELOCATED TO THE SEPARATE SEWERS LOCATED IN THE SIDEWALK ON EACH SIDE OF ELM STREET. SEWER SERVICES SHALL NOT BE RECONNECTED INTO THE PROPOSED DRAIN.
 4. INACTIVE SERVICES SHALL BE ABANDONED IN ACCORDANCE WITH THE SPECIFICATIONS.
 5. EXISTING CATCH BASIN LEADERS SHALL BE RECONNECTED INTO THE PROPOSED 48" DRAIN.
 6. TEST PITS SHALL BE PERFORMED PRIOR TO ORDERING MANHOLE STRUCTURES.

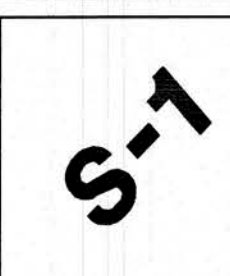
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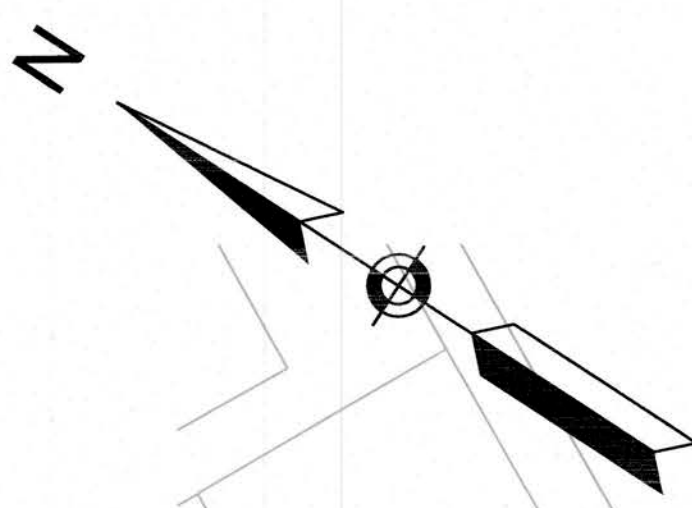


CITY OF SOMERVILLE, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS
CEDAR STREET SEWER SEPARATION PROJECT

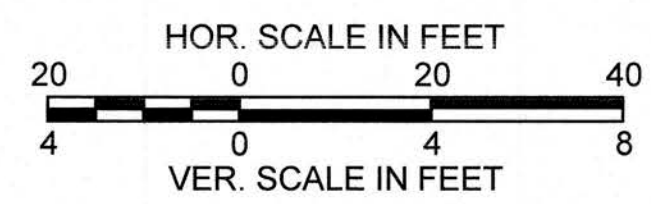
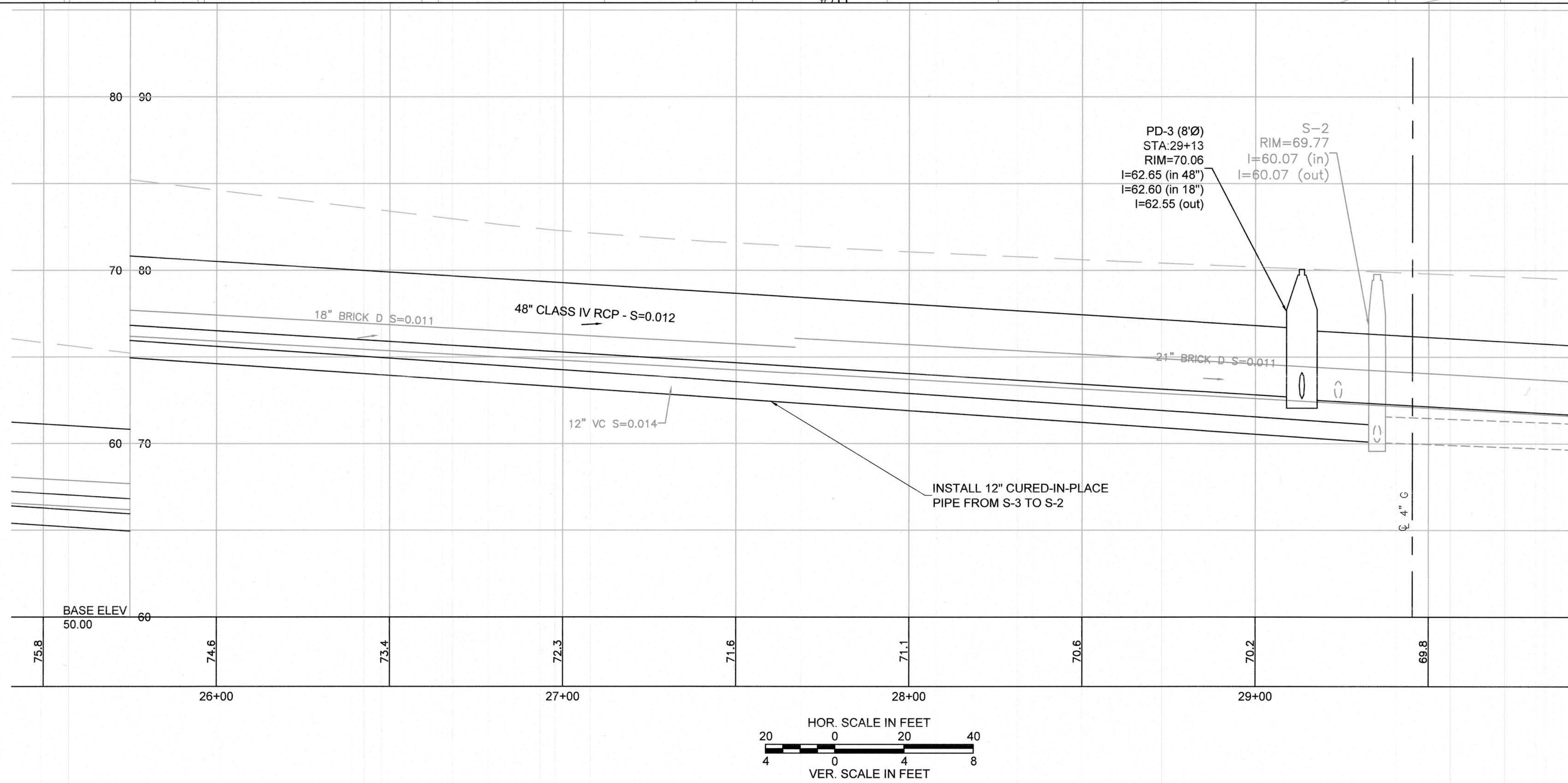
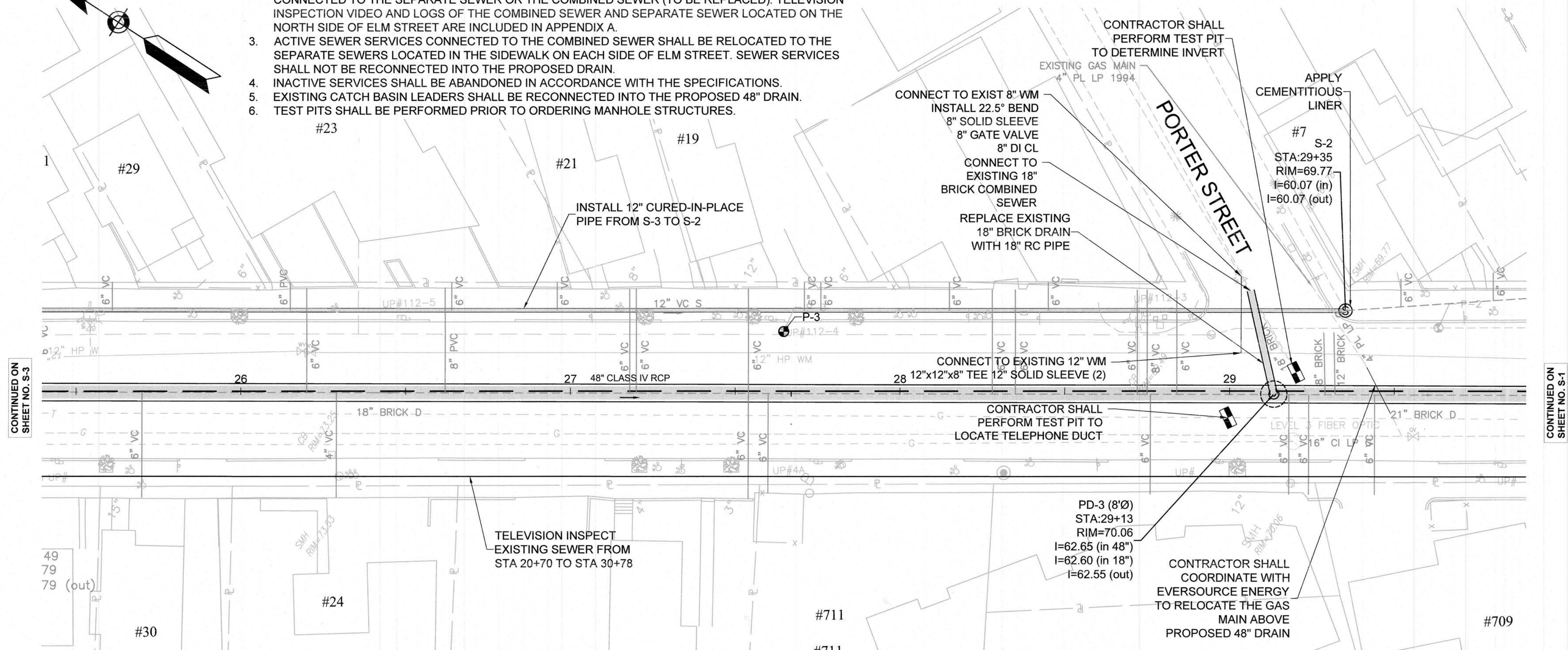
UTILITY PLAN AND PROFILE

CADD NO.	SCALE	CONTRACT	JOB NO.	DR BY	DSN BY	CHK BY	APP BY
214-81	AS NOTED	2130636	2130636	PRG	DME	DME	DME





- NOTES:
1. PRIOR TO INSTALLATION OF 48" DRAIN CONTRACTOR SHALL VERIFY ALL ACTIVE SERVICE CONNECTION LOCATIONS IN THE COMBINED SEWER AND SEPARATE SEWERS (2) THROUGH TELEVISION INSPECTION AND DYE TESTING.
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 6. TEST PITS SHALL BE PERFORMED PRIOR TO ORDERING MANHOLE STRUCTURES.



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FILE NO. 214-80

SHEET 4 OF 33

CITY OF SOMERVILLE, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

CEDAR STREET SEWER SEPARATION PROJECT

ELM STREET
UTILITY PLAN AND PROFILE

CADD NO. —

SCALE: — AS NOTED

CONTRACT: —

JOB NO. 2130636

DR BY: RKP

DSN BY: —

CHK BY: —

APP BY: DME

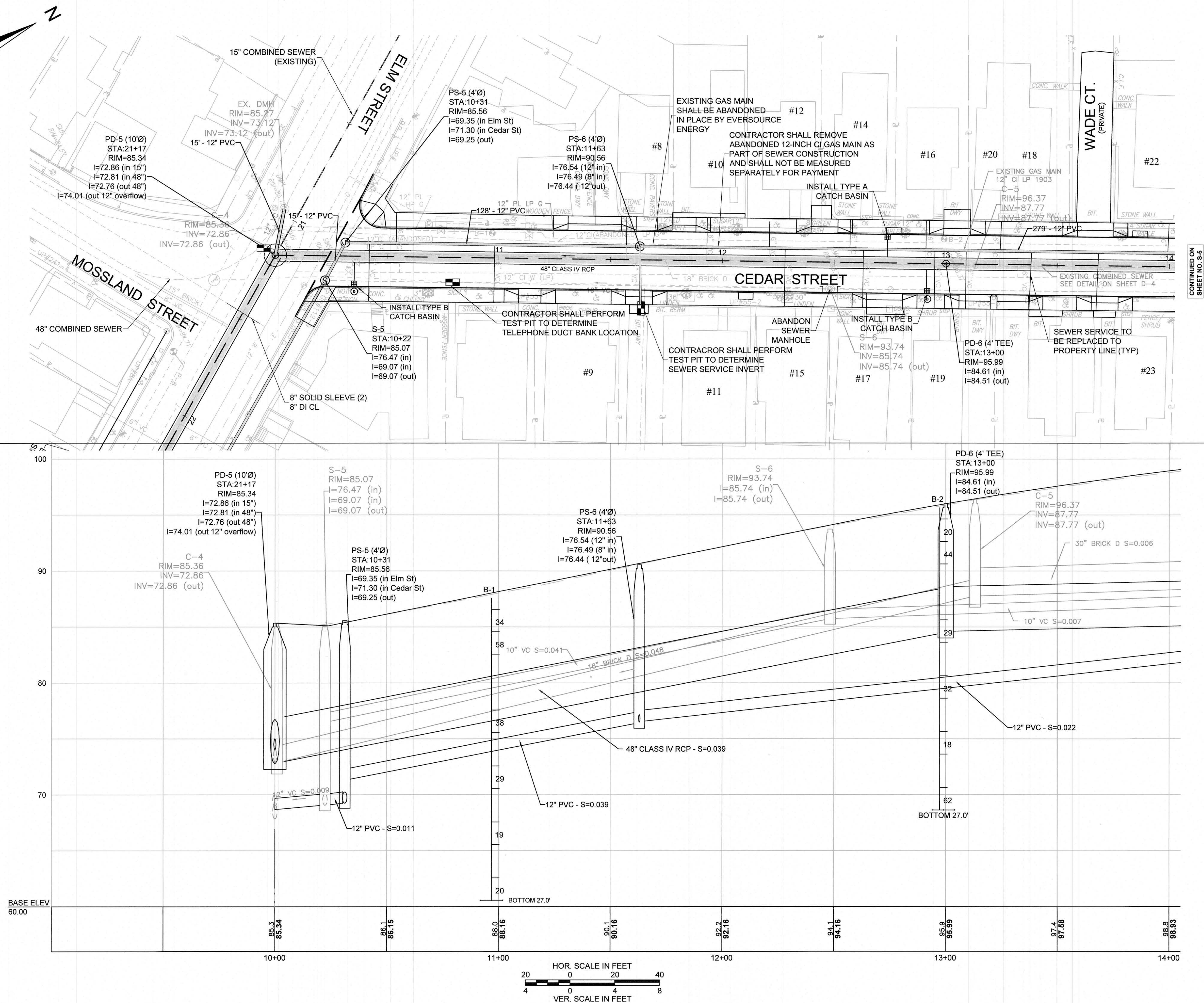
No.	Date	Dr. By	Ck. By	App. By	Description	V	E	D
1	5/11/2011	—	—	—	REGISTERED PROFESSIONAL ENGINEER	—	—	—

REGISTERED PROFESSIONAL ENGINEER

DATE 1/25/11

COMMONWEALTH OF MASSACHUSETTS
DAVID M. ELMER
No. 41507
REGISTERED PROFESSIONAL ENGINEER

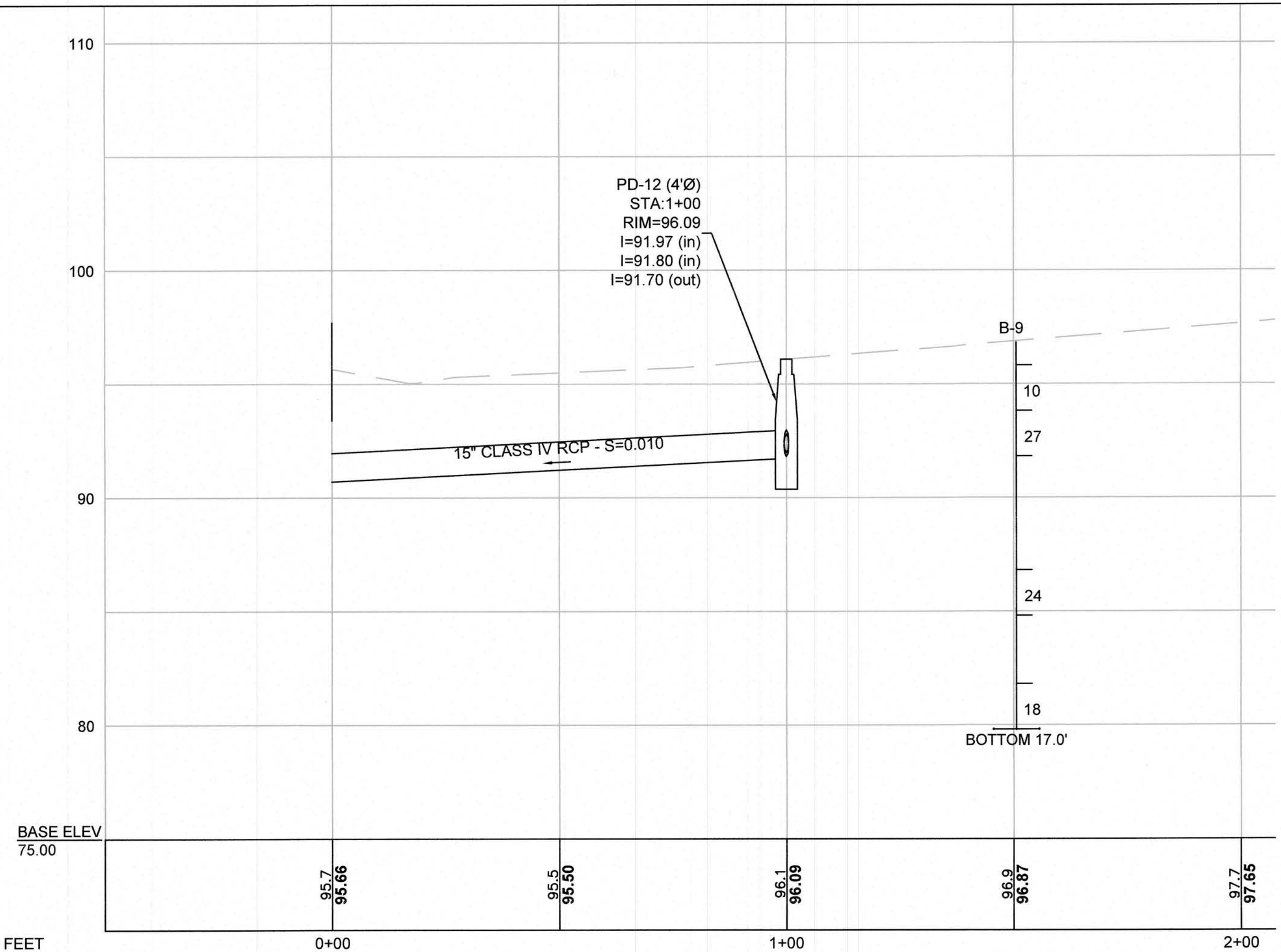
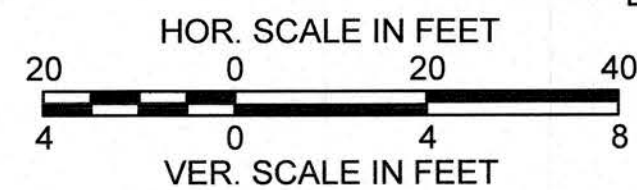
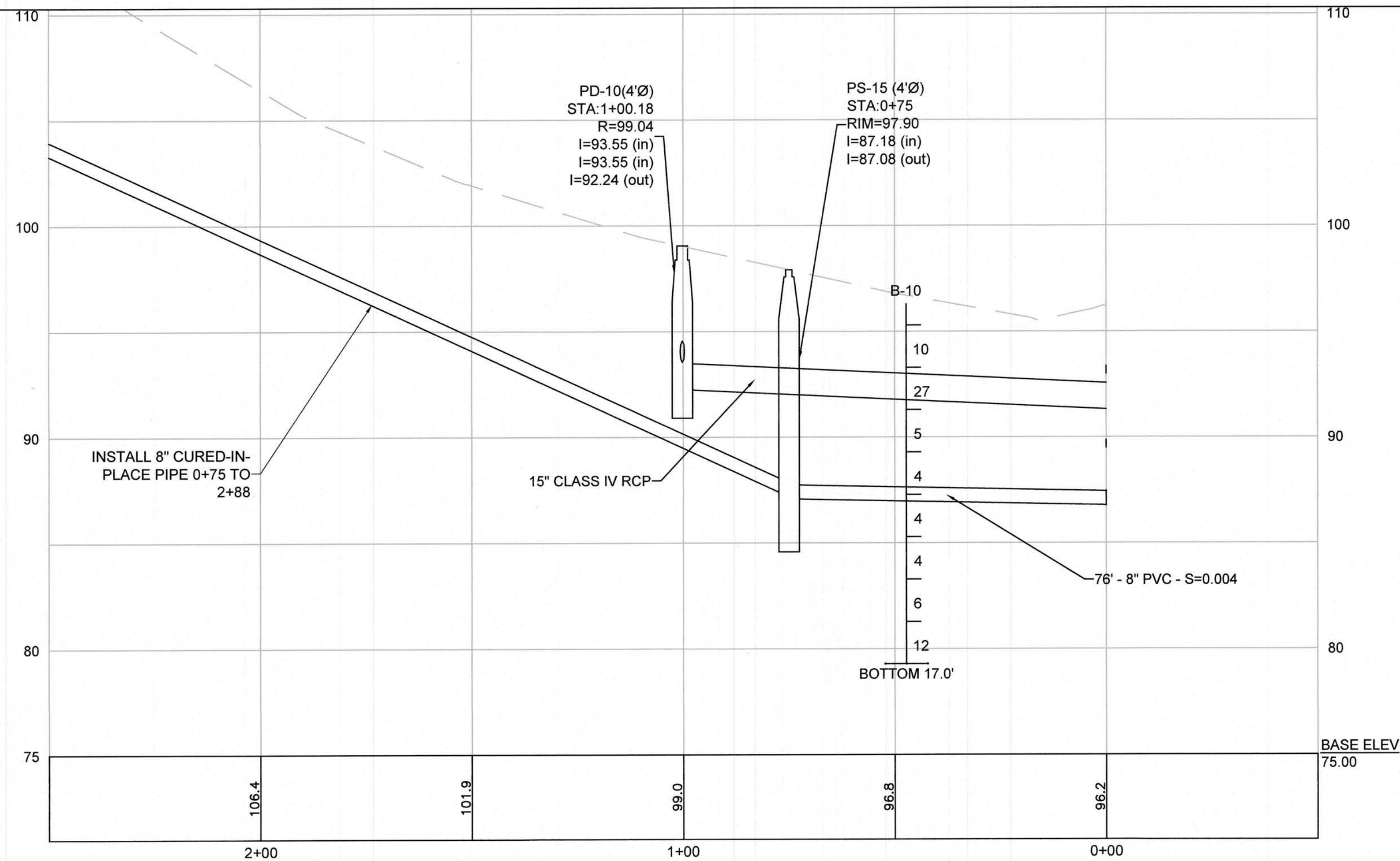
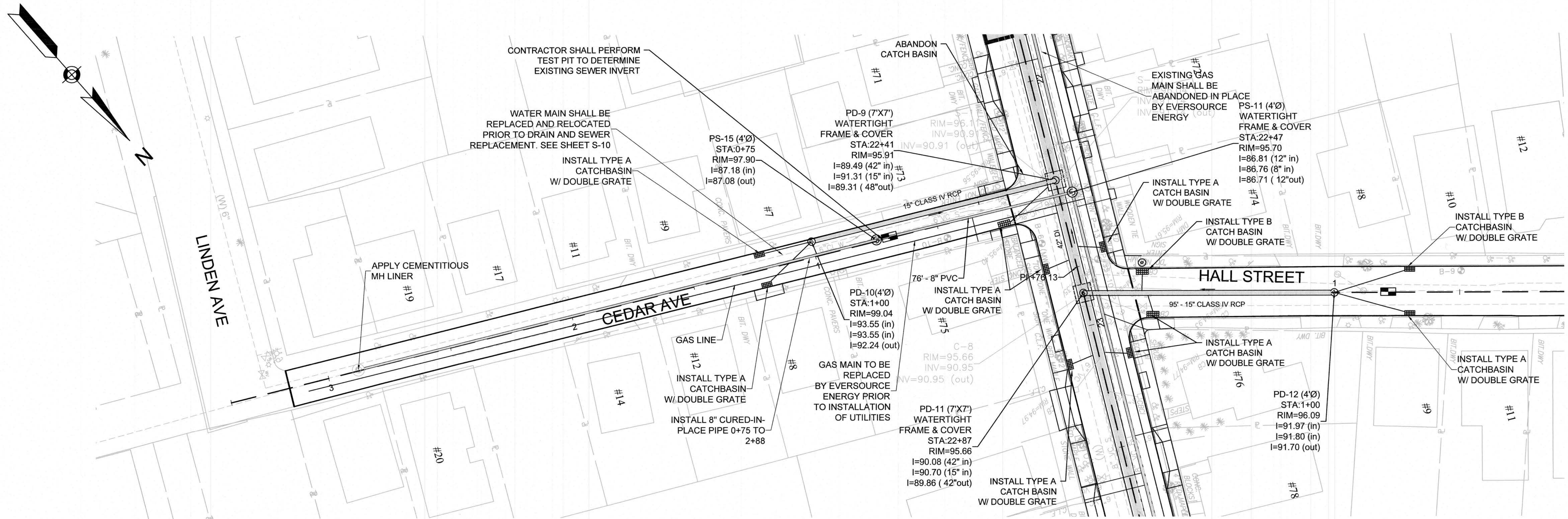
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[illegible]

CONTRACT	JOB NO	JOB RV	RSN RV	CHK RV	APP RV
CEDAR STREET SEWER SEPARATION PROJECT					
CEDAR STREET					
UTILITY PLAN AND PROFILE					

SHEET 6 OF 6
 S-4
 FILE NO. CAD NO. SCALE

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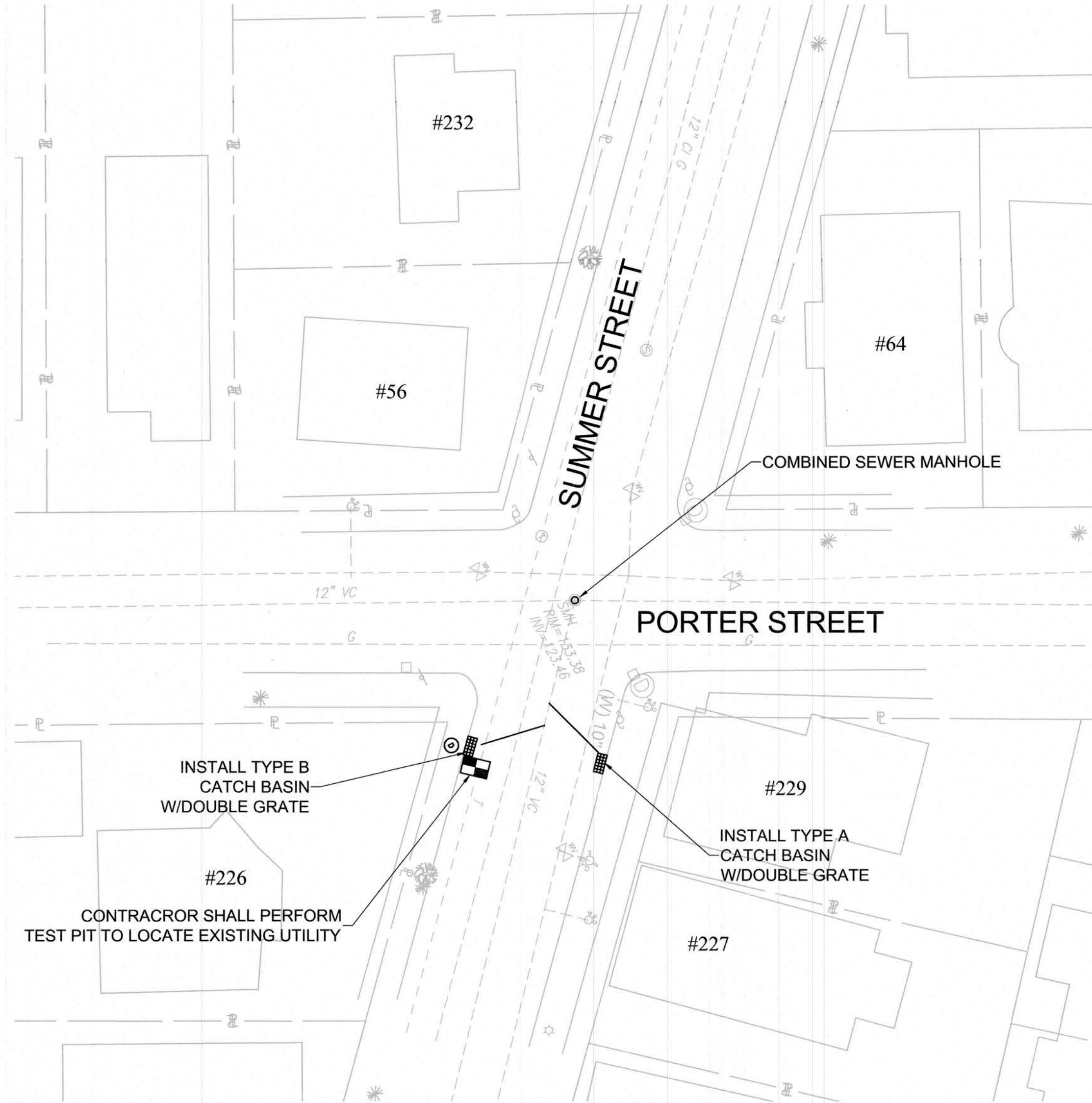
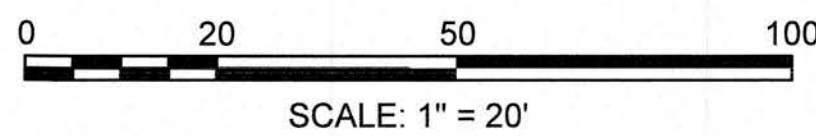
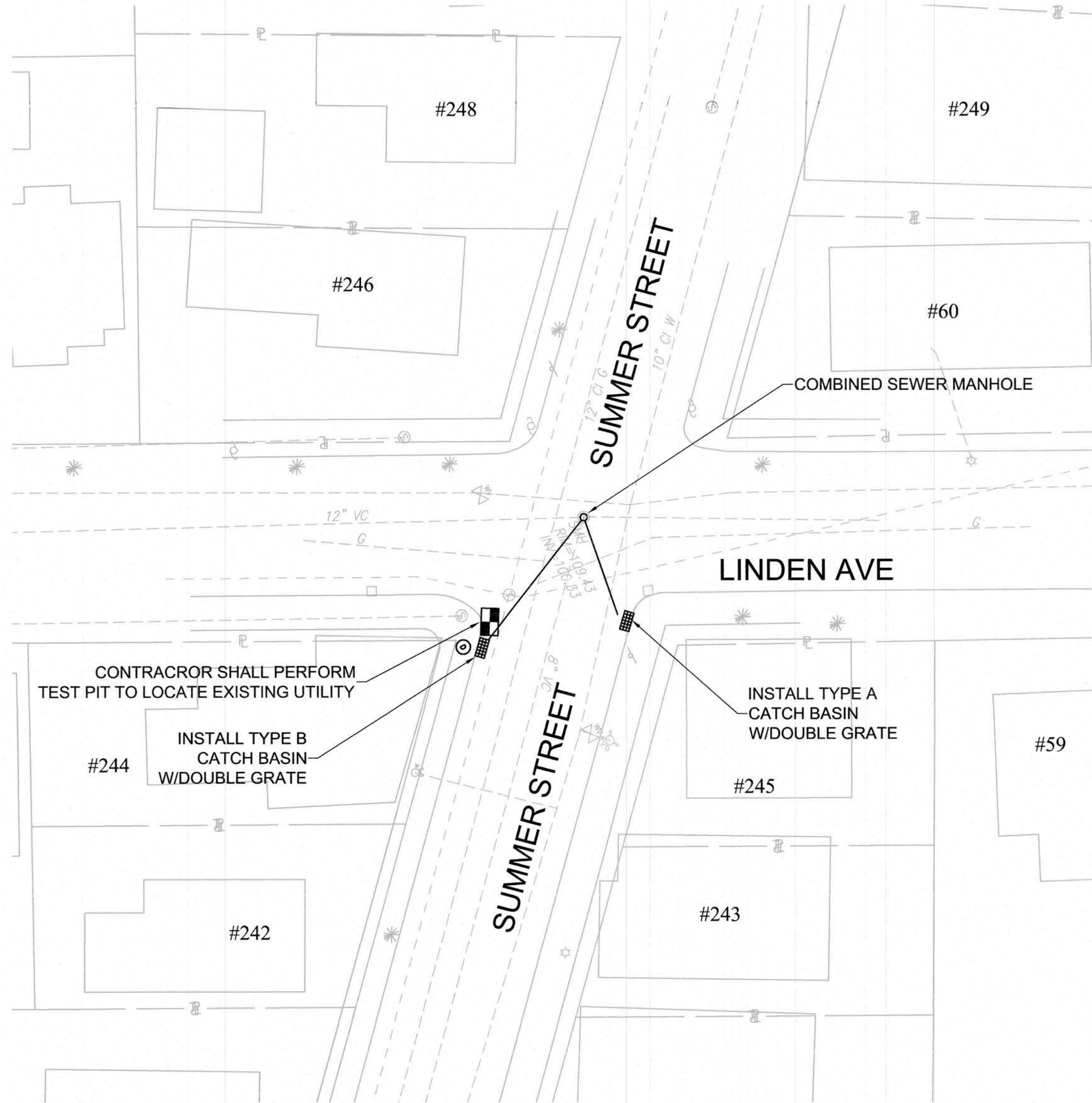
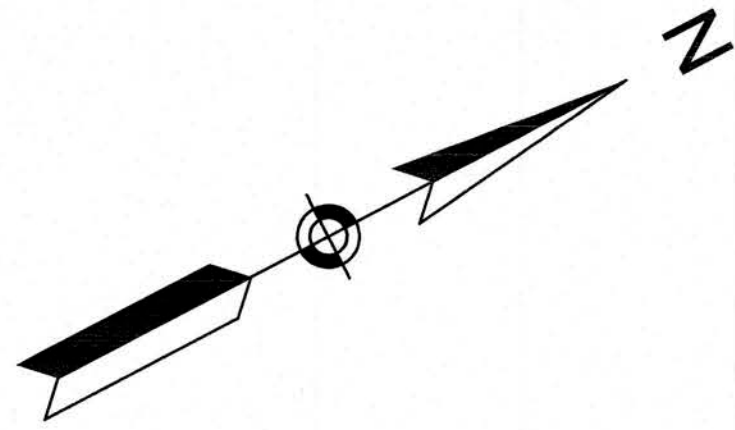
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www.westonsandsampson.com



CITY OF SOMERVILLE, MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS CEDAR STREET SEWER SEPARATION PROJECT CEDAR AVENUE & HALL STREET UTILITY PLAN AND PROFILE									
FILE NO.	214-74	CADD NO.	-	SCALE:	AS NOTED	CONTRACT:	-	JOB NO.	2130636
DR BY	DR BY	CHK BY	APP BY	PRG	DME	DME	DME	DME	DME

S-8

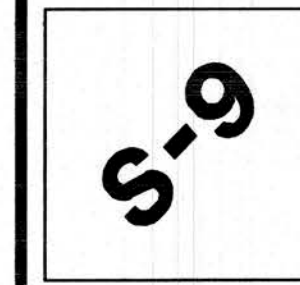
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CITY OF SOMERVILLE, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

CEDAR STREET SEWER SEPARATION PROJECT

LINDEN AVENUE & PORTER STREET
UTILITY PLAN AND PROFILE



FILE NO. 214-73

CADD NO.	SCALE	CONTRACT	JOB NO.	DR.BY	DSN.BY	CHK.BY	APP.BY
-	AS NOTED	-	2130636	RKP	PRG	DME	DME

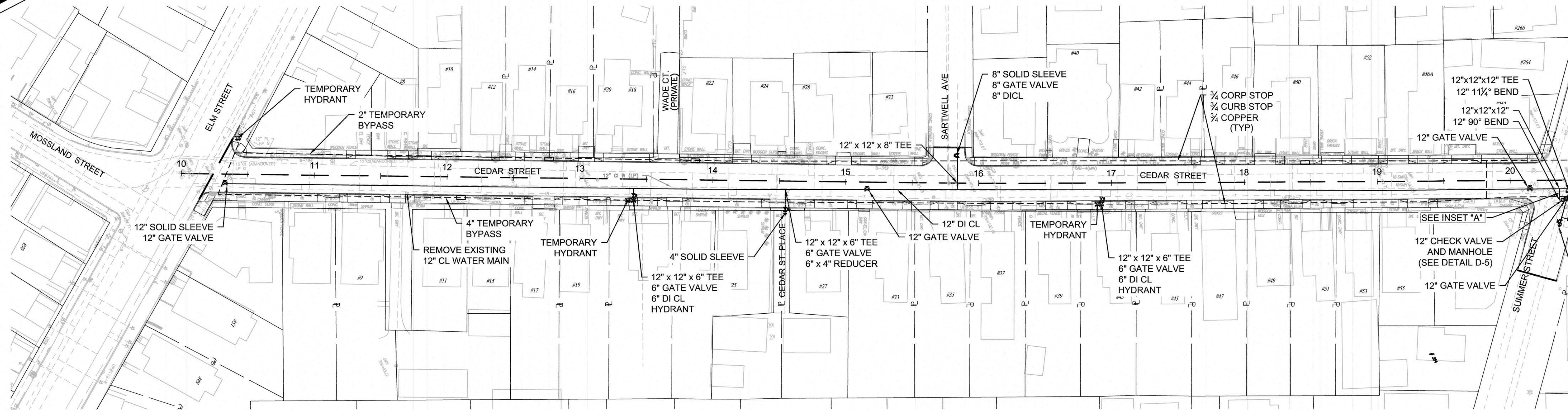
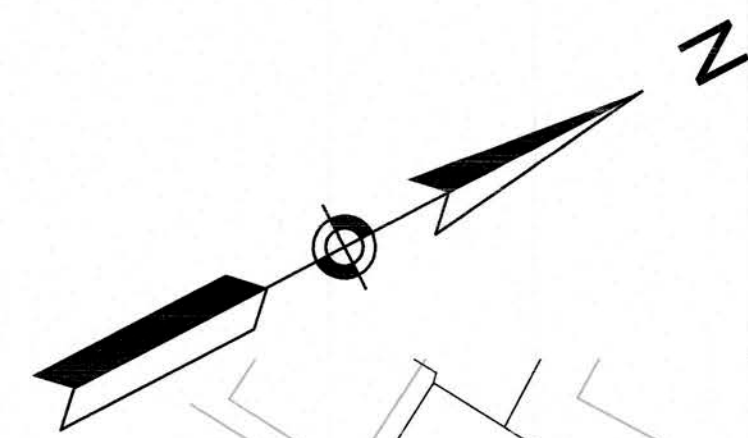


No.	Date	Dr By	Ck By	App By	Description
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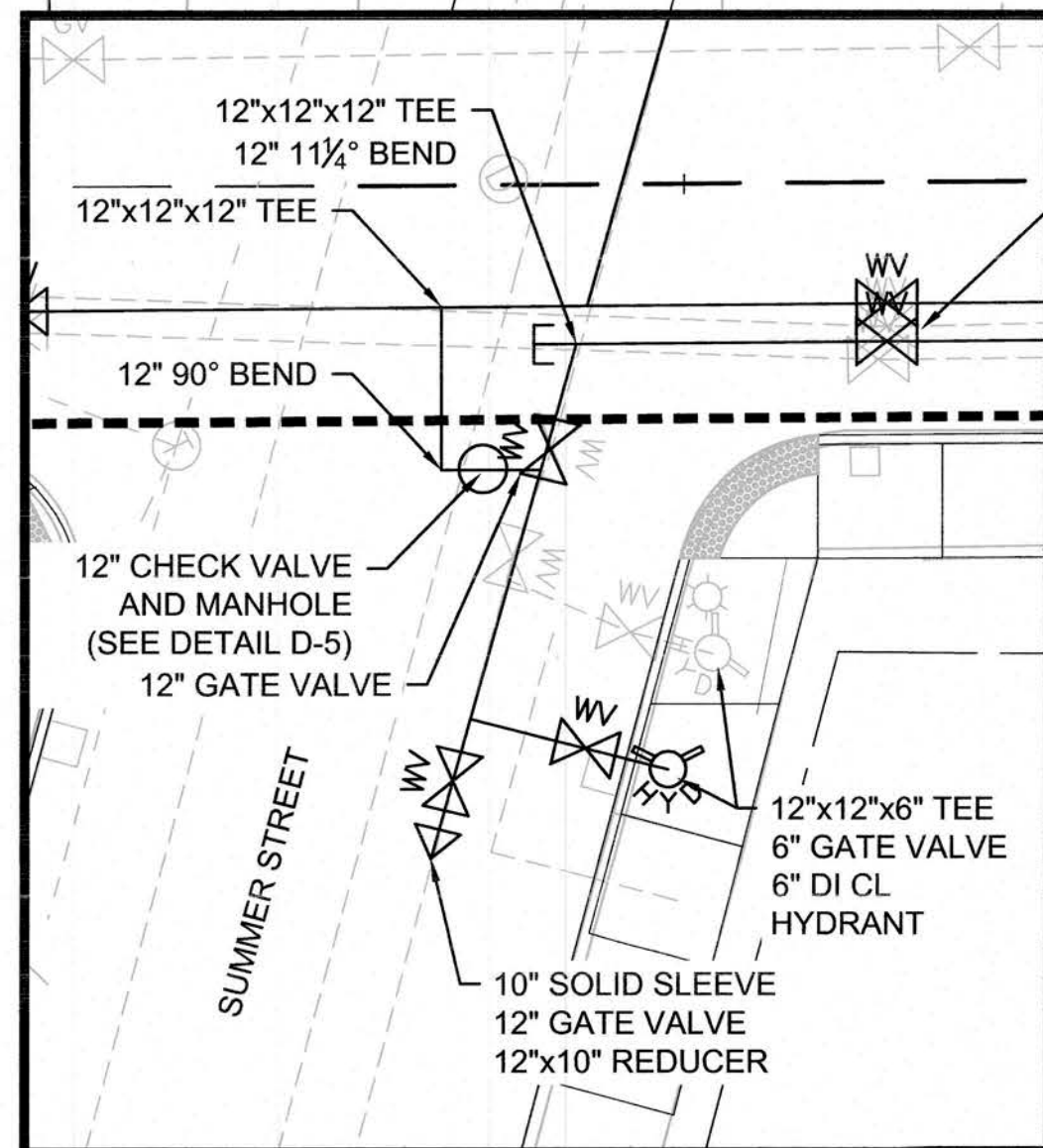
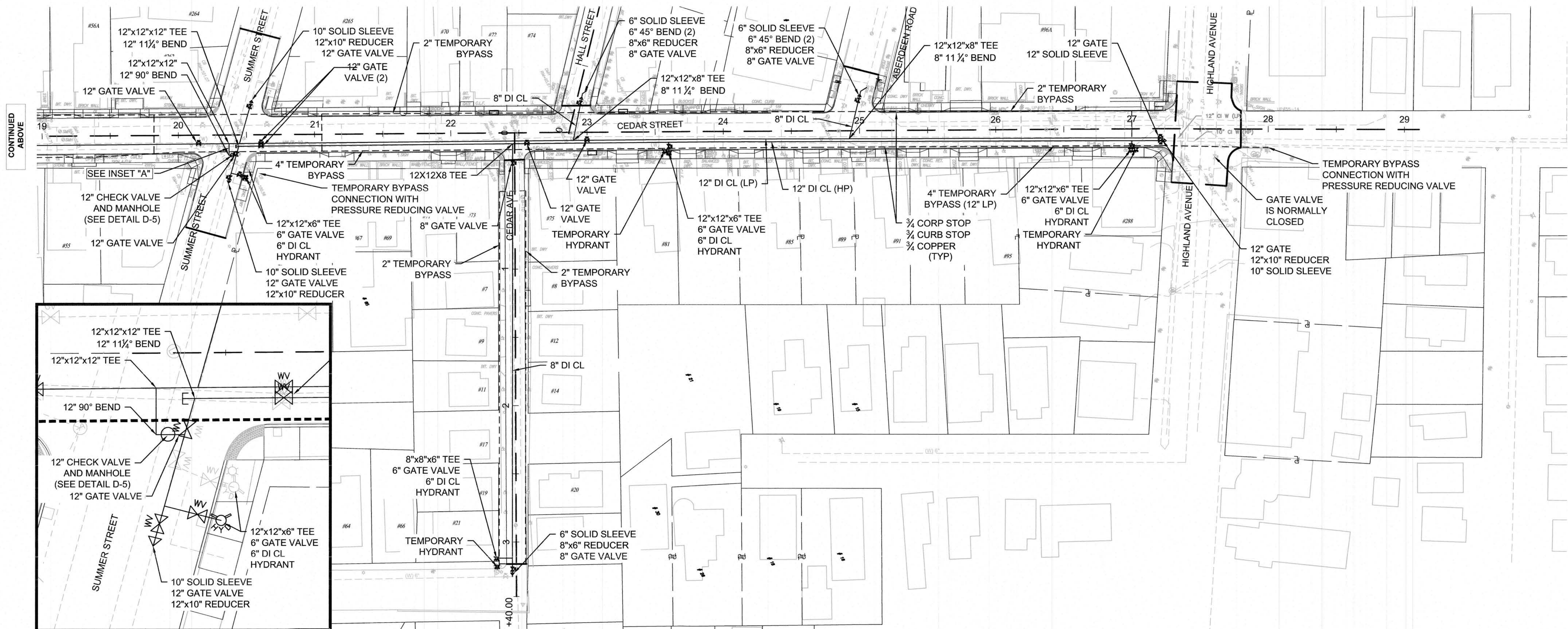
REGISTERED PROFESSIONAL ENGINEER
DATE 1/31/16

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CONTINUED
BELOW



INSET "A"
SCALE 1" = 10'

0 40 100 160
SCALE: 1" = 40'

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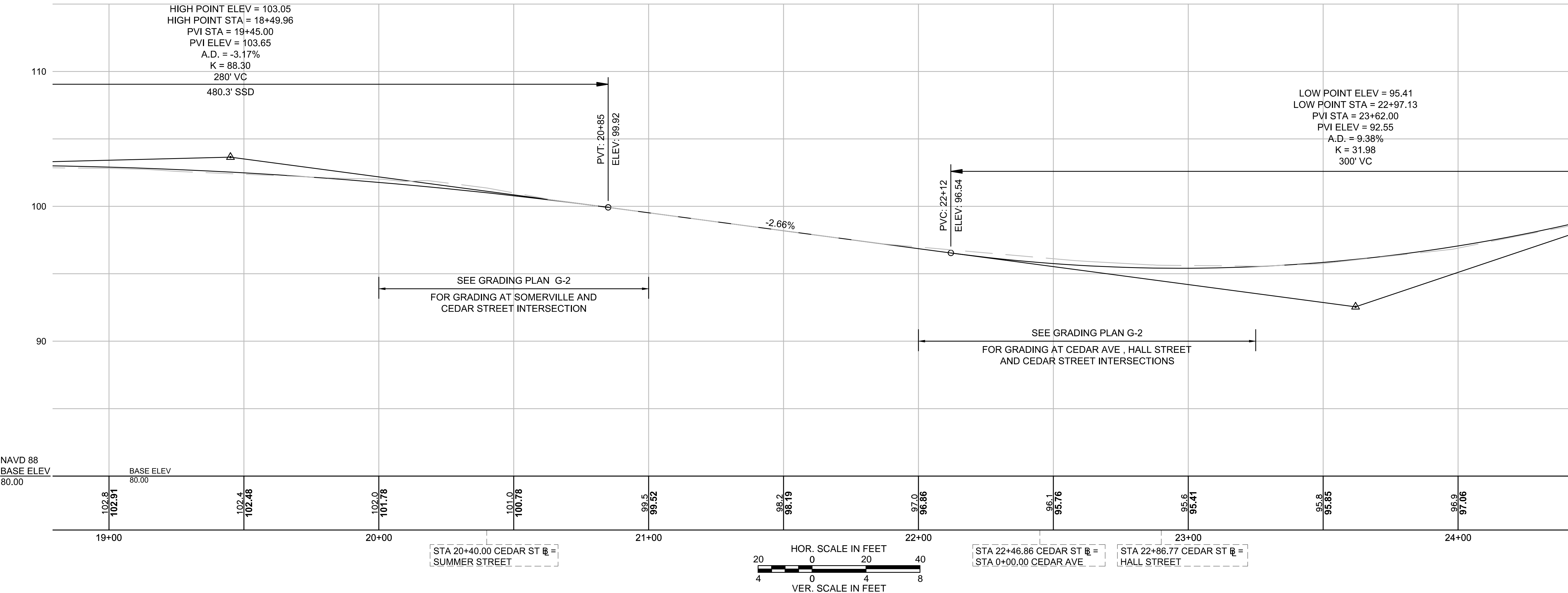
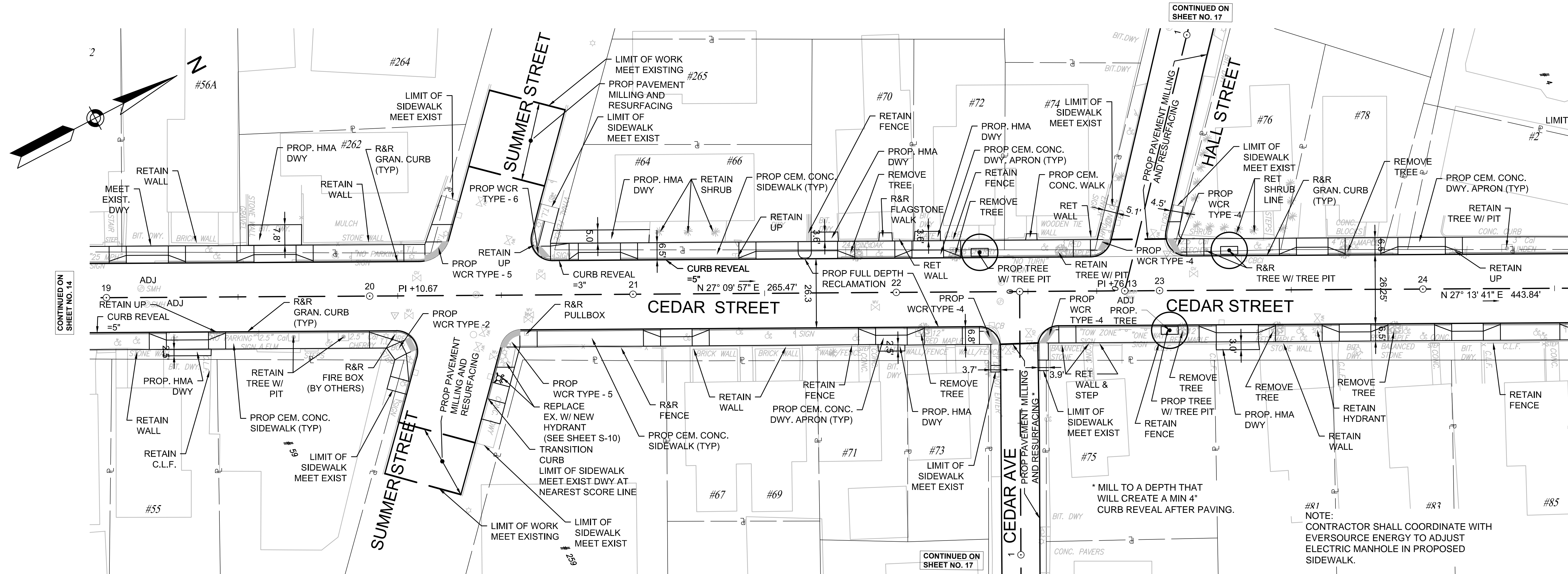
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No.	Date	Dr. By	Ck. By	App. By	Description
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CITY OF SOMERVILLE, MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS	CEDAR STREET SEWER SEPARATION PROJECT	CEDAR STREET & CEDAR AVENUE UTILITY PLAN - WATER MAIN
CADD NO.	CONTRACT	SCALE
JOB NO.	DR. BY	CHK. BY
2130636	RKP	DME
AS NOTED		

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No.	Date	Dr. By	Ck. By	App. By	Description
		A	P	R	O
					V
					E
					D

1:25=16
DATE

Laurence F. Keane
REGISTERED PROFESSIONAL ENGINEER

COMMONWEALTH OF MASSACHUSETTS
LAURENCE F. KEANE
REGISTERED PROFESSIONAL ENGINEER
NO. 33708
STATE OF MASSACHUSETTS

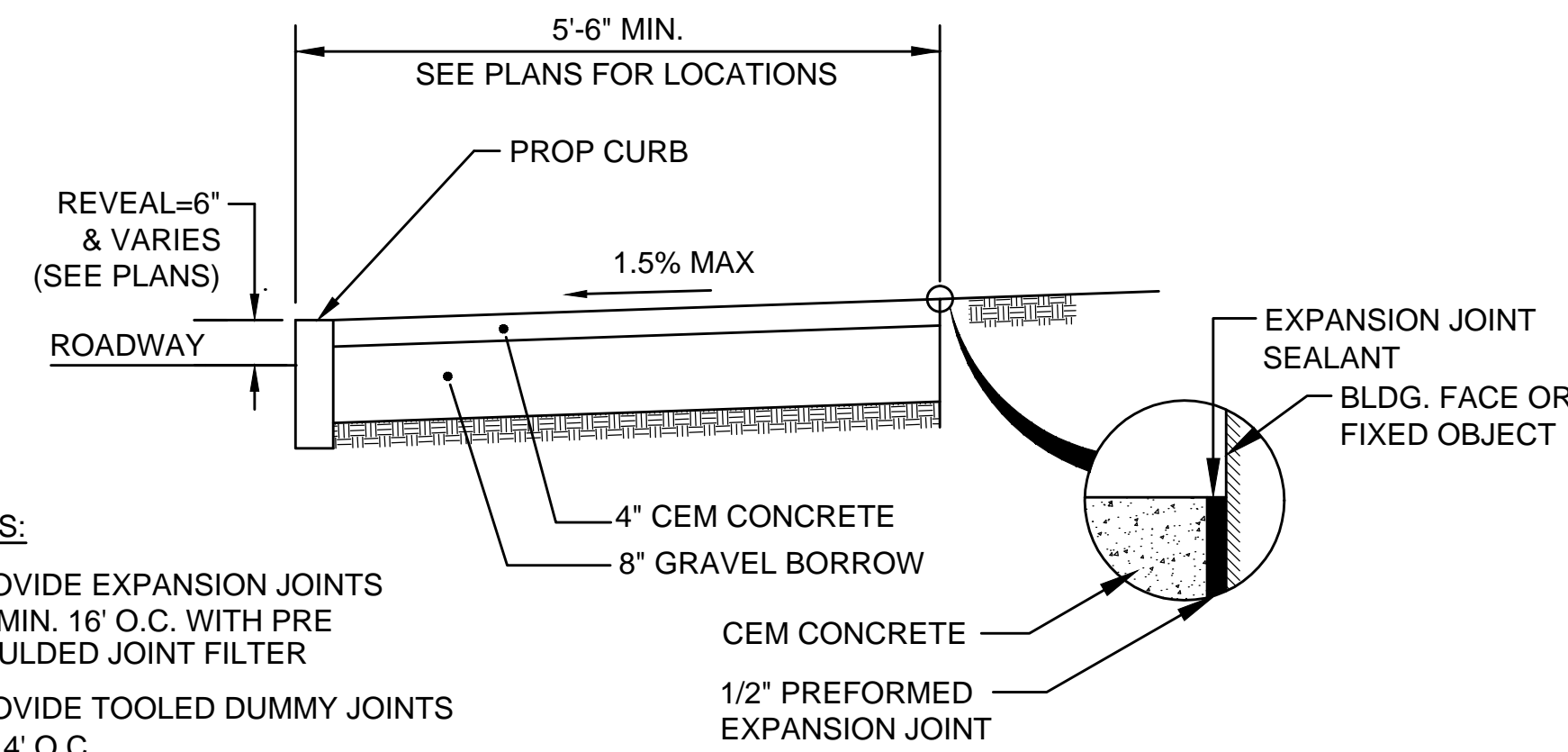
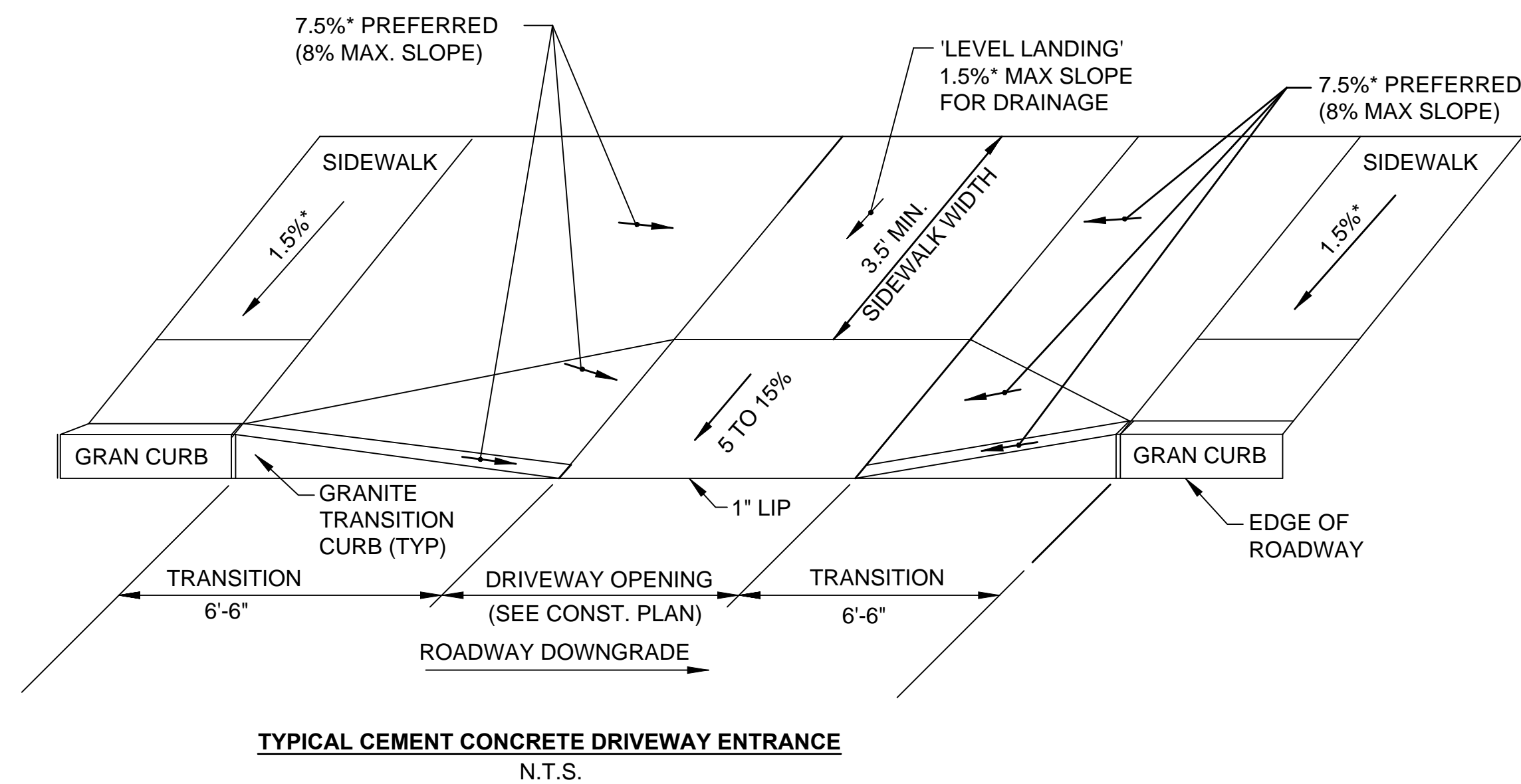
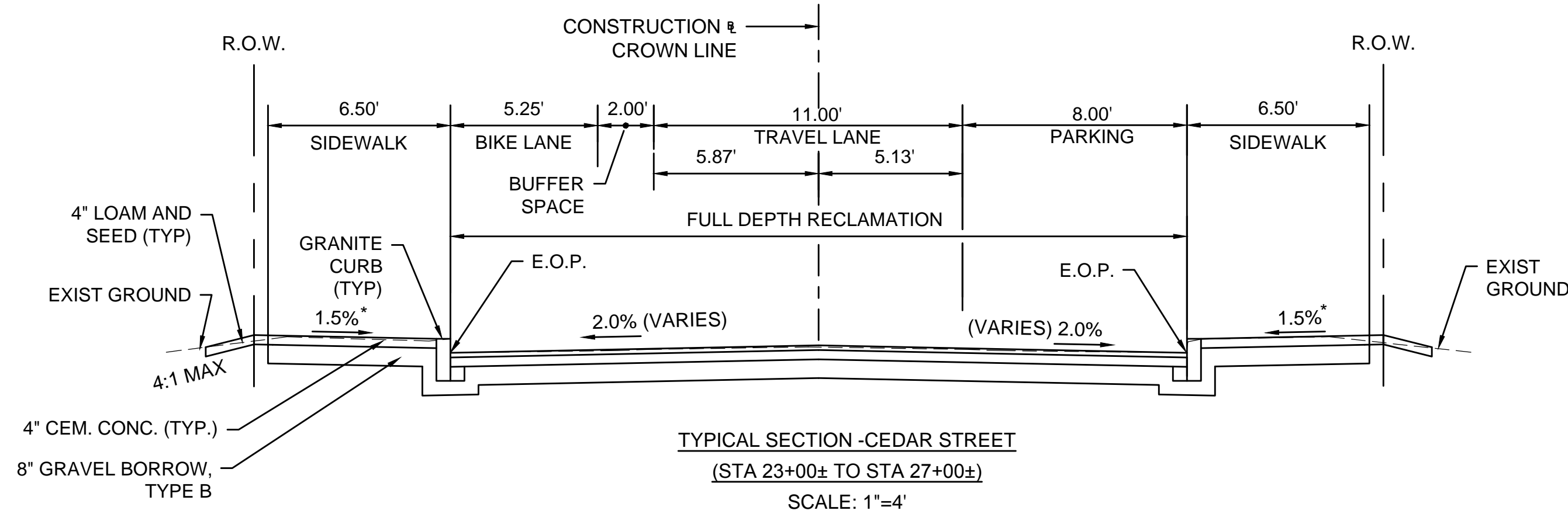
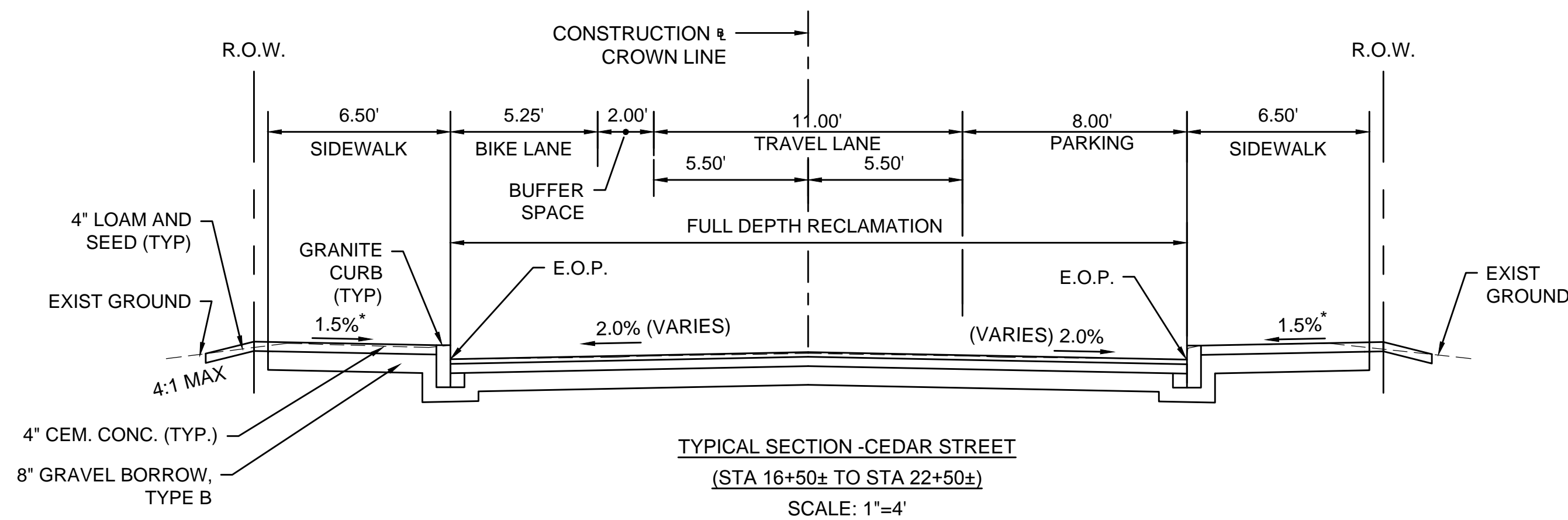
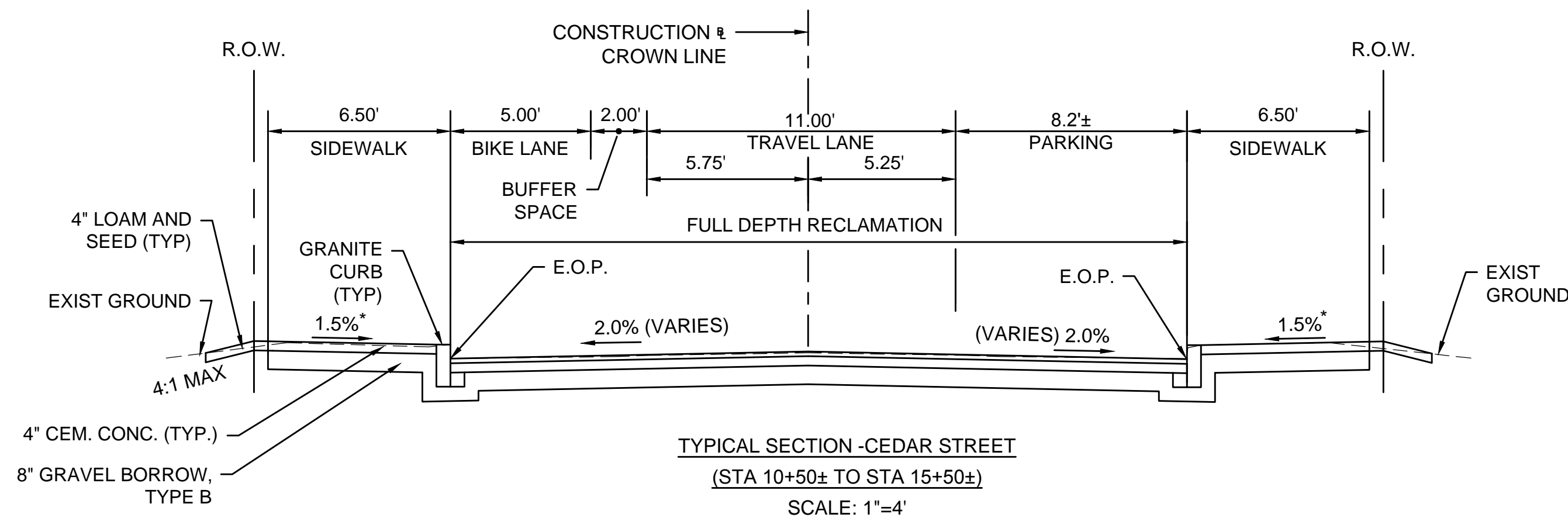
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C-3

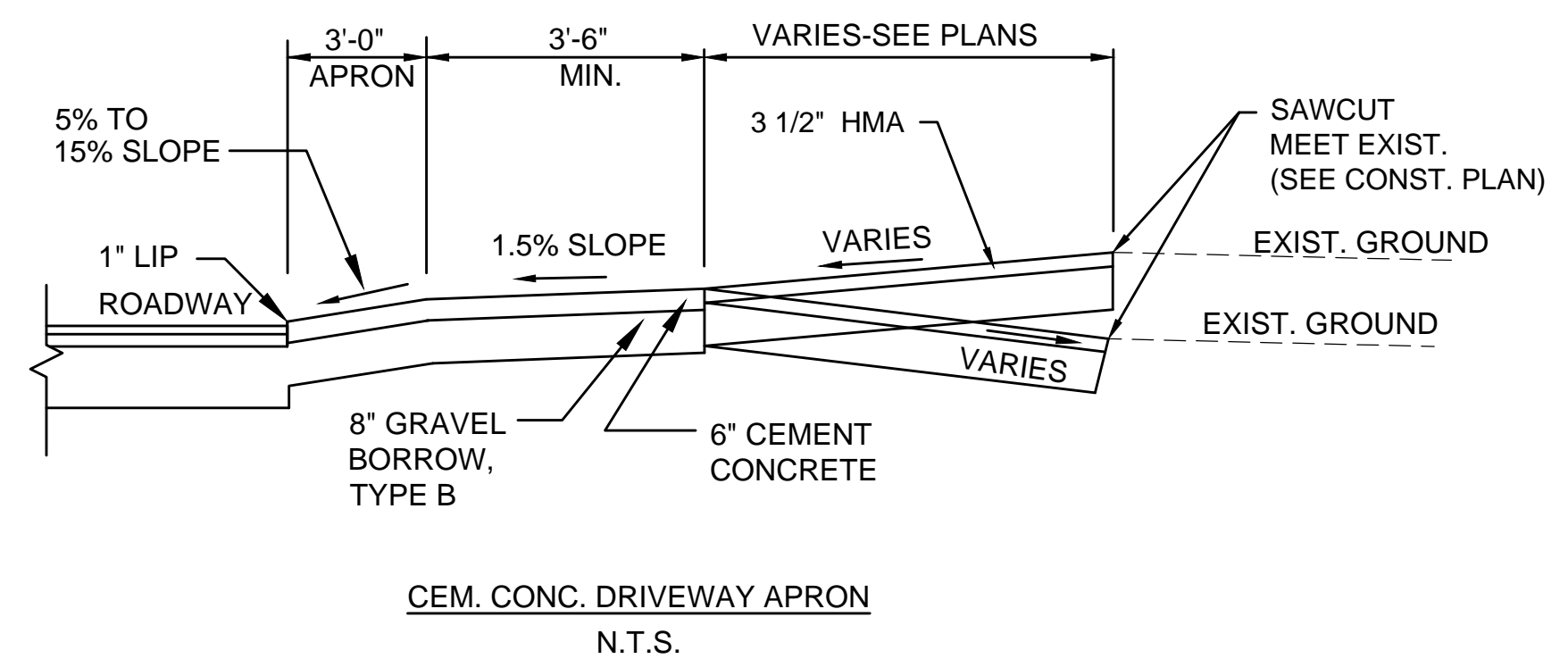
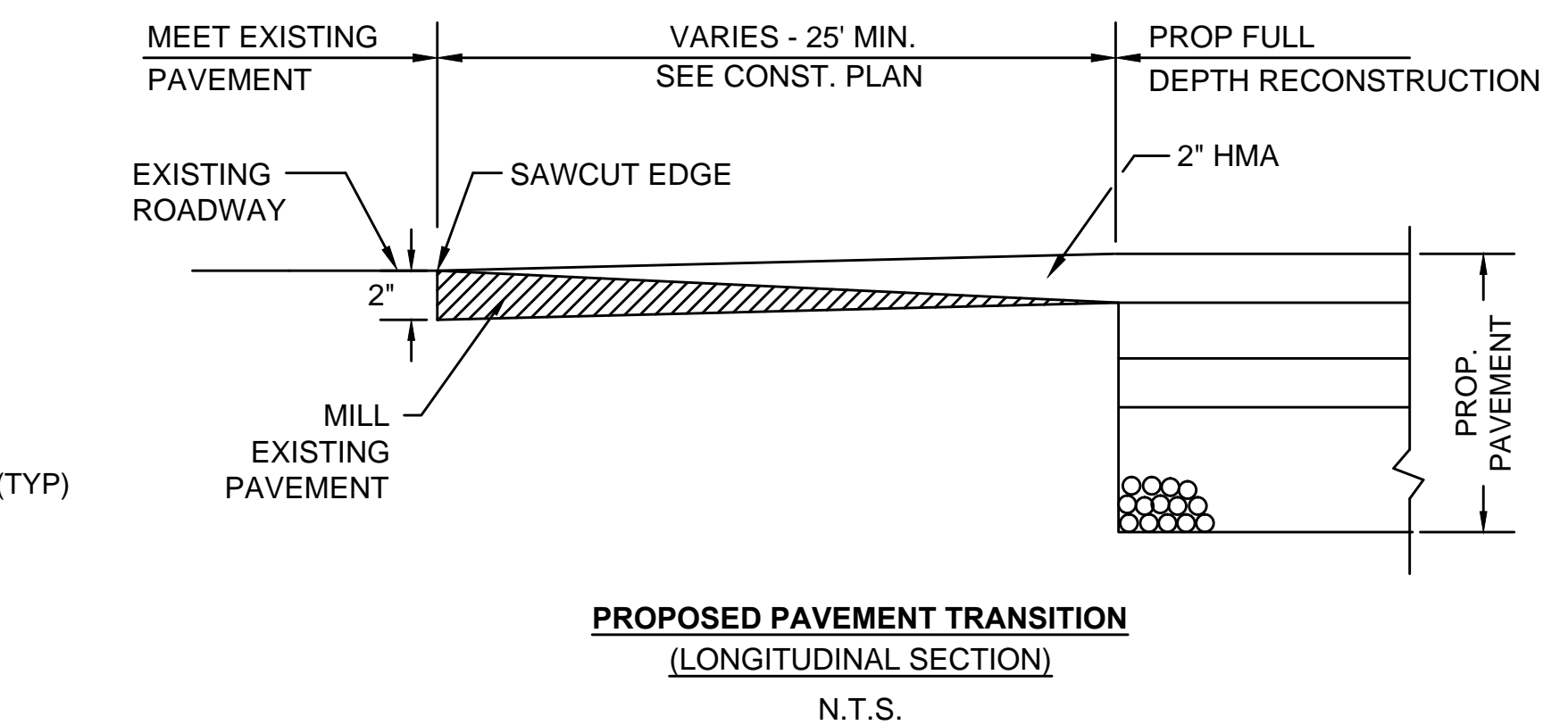
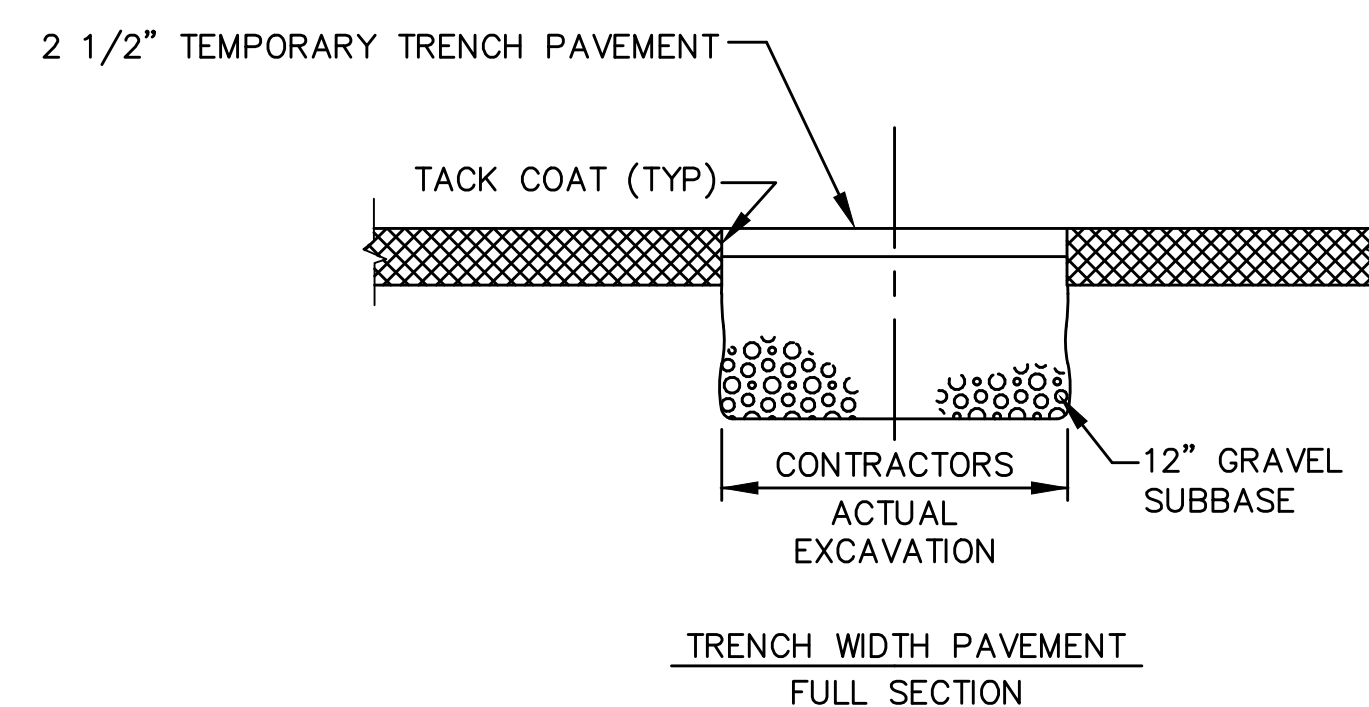
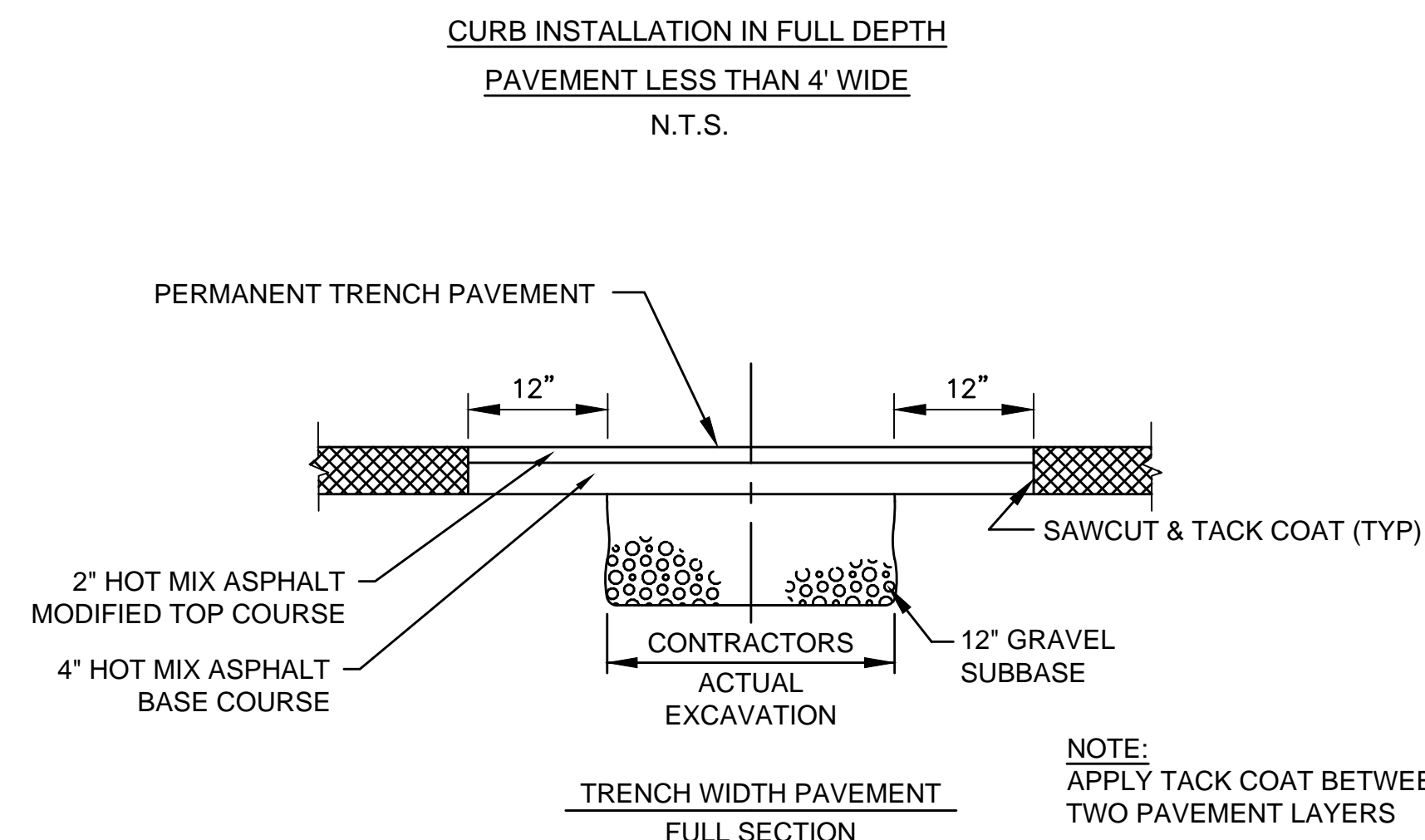
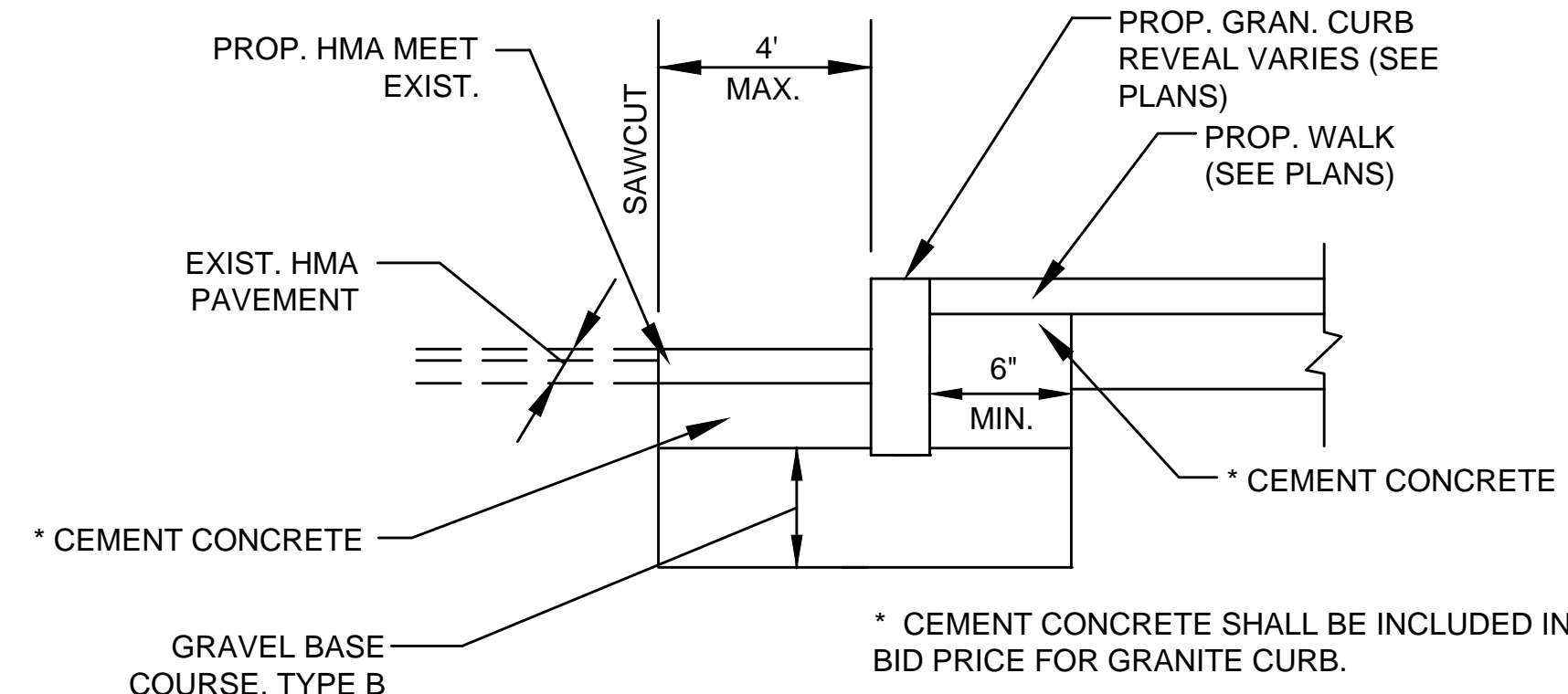
FILE NO. 214-69
SHEET 15 OF 33

CITY OF SOMERVILLE, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS
CEDAR STREET SEWER SEPARATION PROJECT

ROADWAY CONSTRUCTION PLAN AND PROFILE



- NOTES:**
1. PROVIDE EXPANSION JOINTS AT MIN. 16' O.C. WITH PRE MOULDED JOINT FILTER
 2. PROVIDE TOOLED DUMMY JOINTS AT 4' O.C.
 3. BROOM FINISH PATTERN

PAVEMENT NOTES

PAVEMENT MILLING AND PROPOSED RESURFACING:

2" HOT MIX ASPHALT - MODIFIED TOP COURSE OVER
2" MILLED SURFACE

PROPOSED FULL DEPTH RECLAMATION:

2" HOT MIX ASPHALT - MODIFIED TOP COURSE OVER
4" HOT MIX ASPHALT - BASE COURSE OVER
8" RECLAIMED PAVEMENT W/CRUSHED STONE FOR BLENDING

PROPOSED HOT MIX ASPHALT DRIVEWAY OR HOT MIX ASPHALT WALK:

1 1/2" HOT MIX ASPHALT - MODIFIED TOP COURSE OVER
2" HOT MIX ASPHALT - INTERMEDIATE COURSE - BINDER OVER
8" GRAVEL BORROW, TYPE B

PROPOSED CEMENT CONCRETE DRIVEWAY APRON:

6" CEMENT CONCRETE OVER
8" GRAVEL BORROW, TYPE B

PROPOSED CEMENT CONCRETE WALK:

4" CEMENT CONCRETE OVER
8" GRAVEL BORROW, TYPE B

PROPOSED CEMENT CONCRETE WHEELCHAIR RAMP:

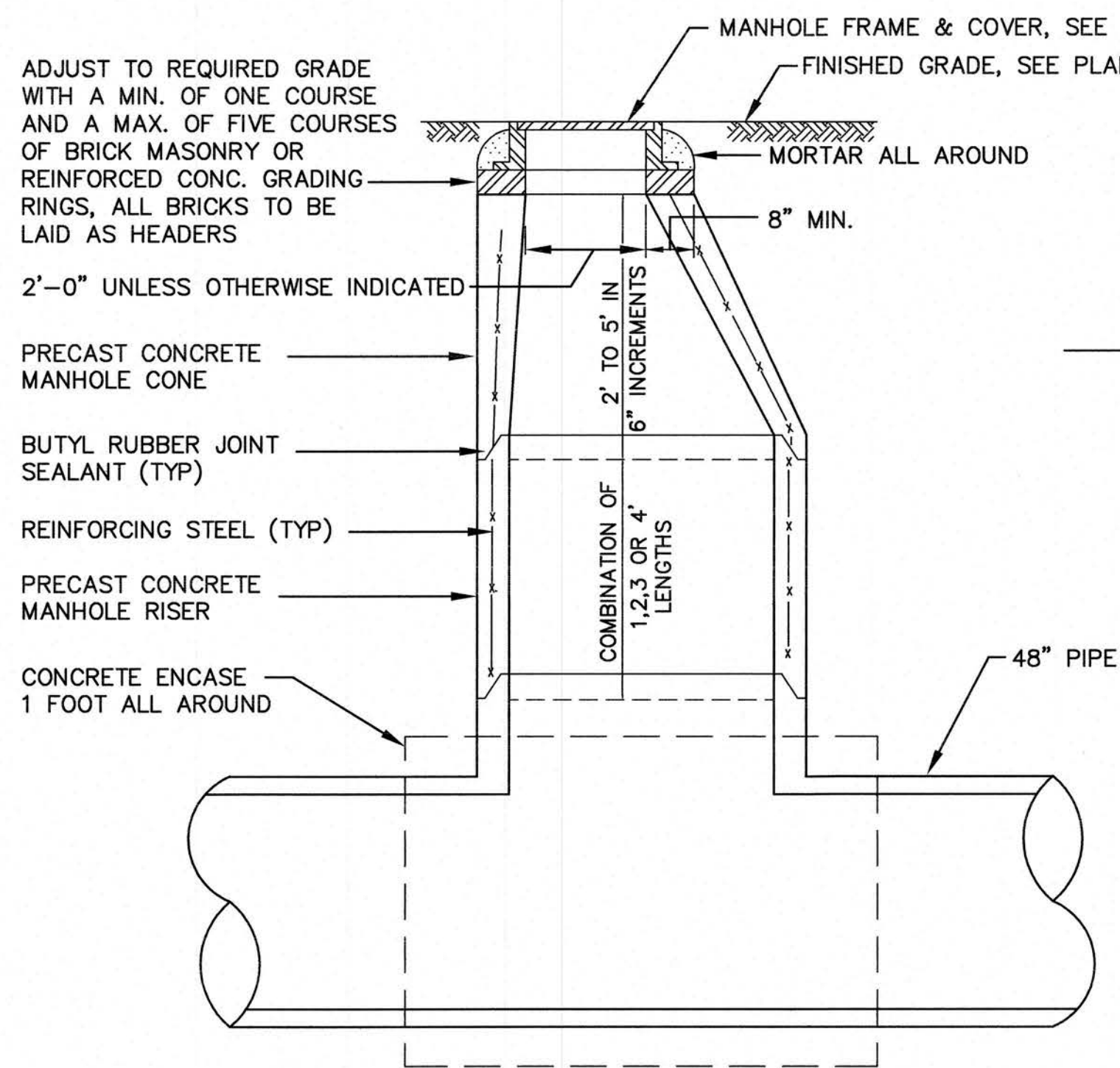
4" CEMENT CONCRETE OVER
8" GRAVEL BORROW, TYPE B

PROPOSED TEMPORARY HOT MIX ASPHALT PATCH FOR TRENCH:

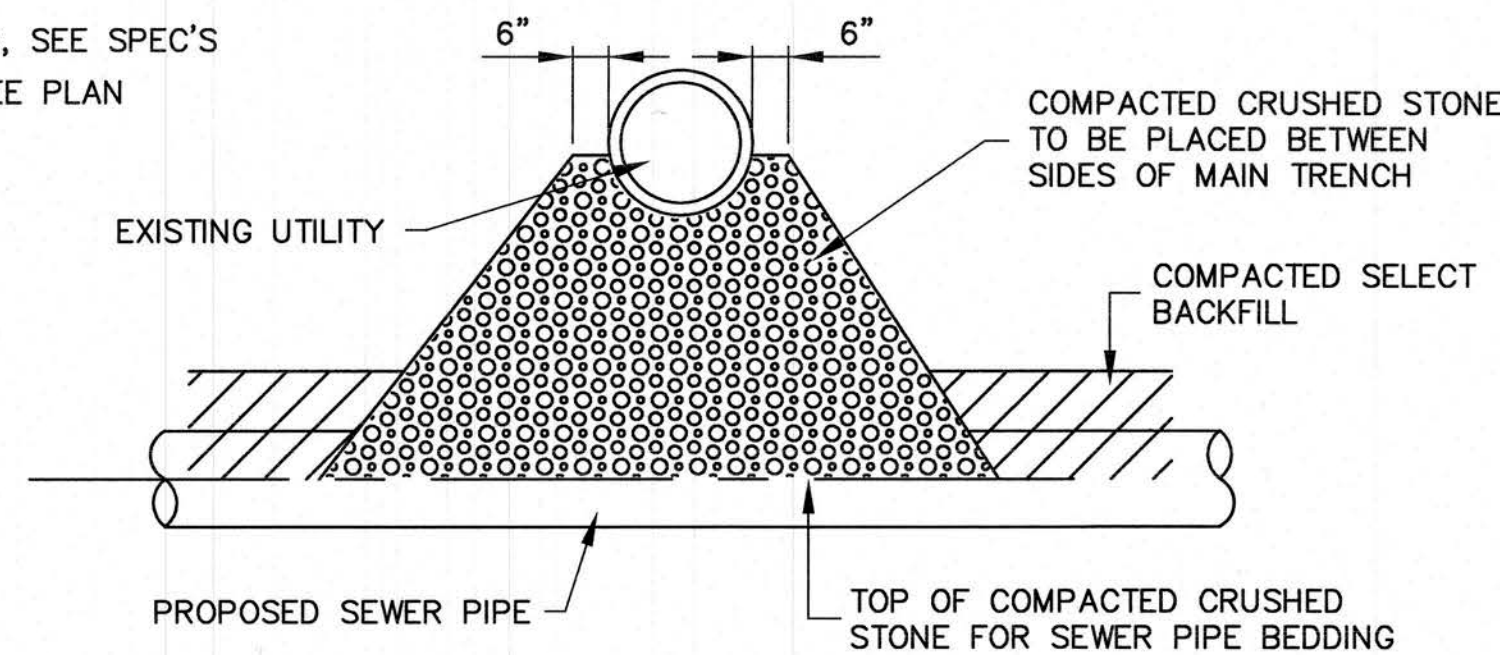
2 1/2" HOT MIX ASPHALT

TACK COAT:

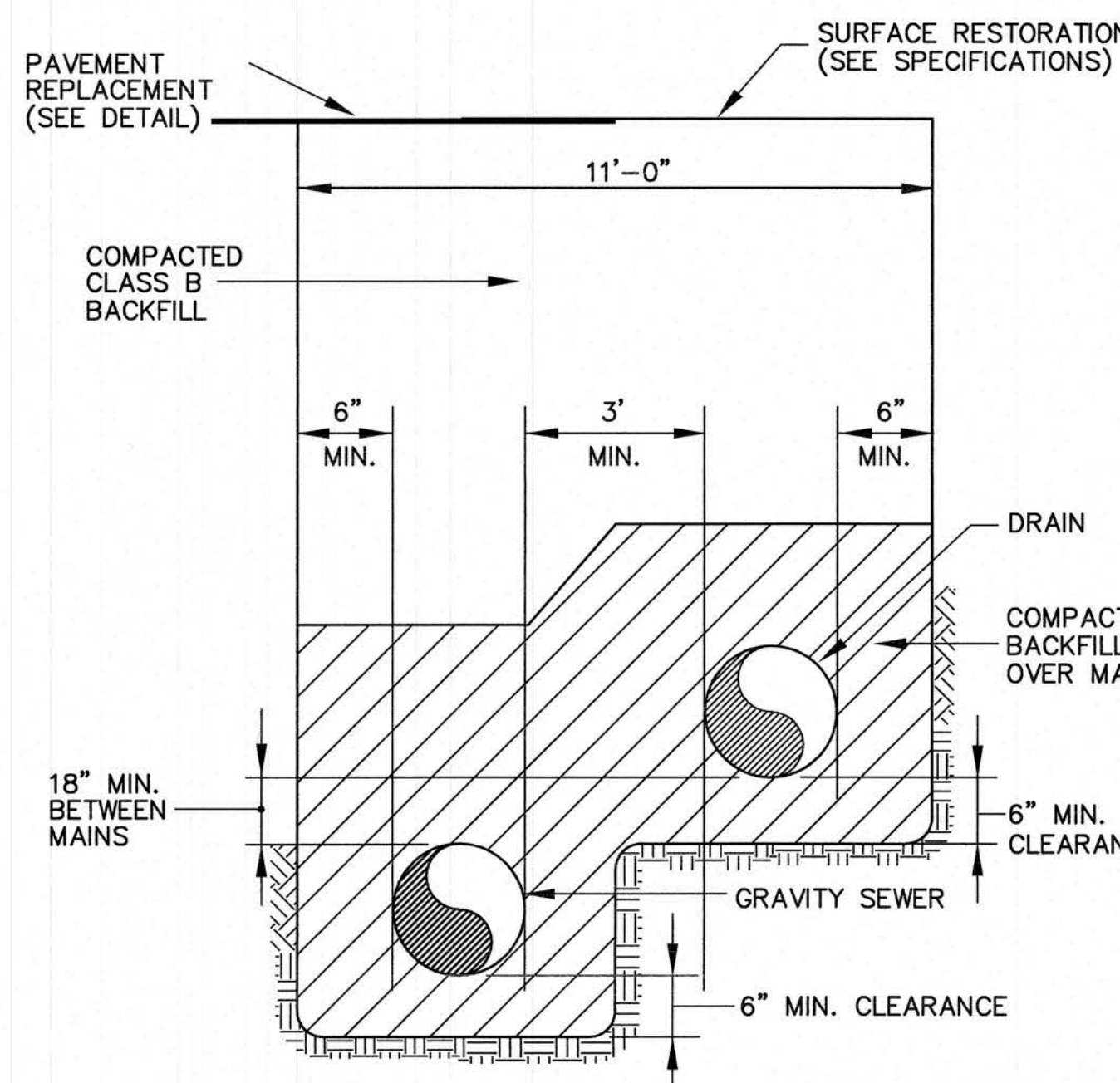
TACK COAT SHALL BE APPLIED AT RATE OF 0.07 GALLON PER SQUARE YARD OVER MILLED SURFACES AND 0.05 GALLON PER SQUARE YARD OVER SMOOTH PAVED SURFACES



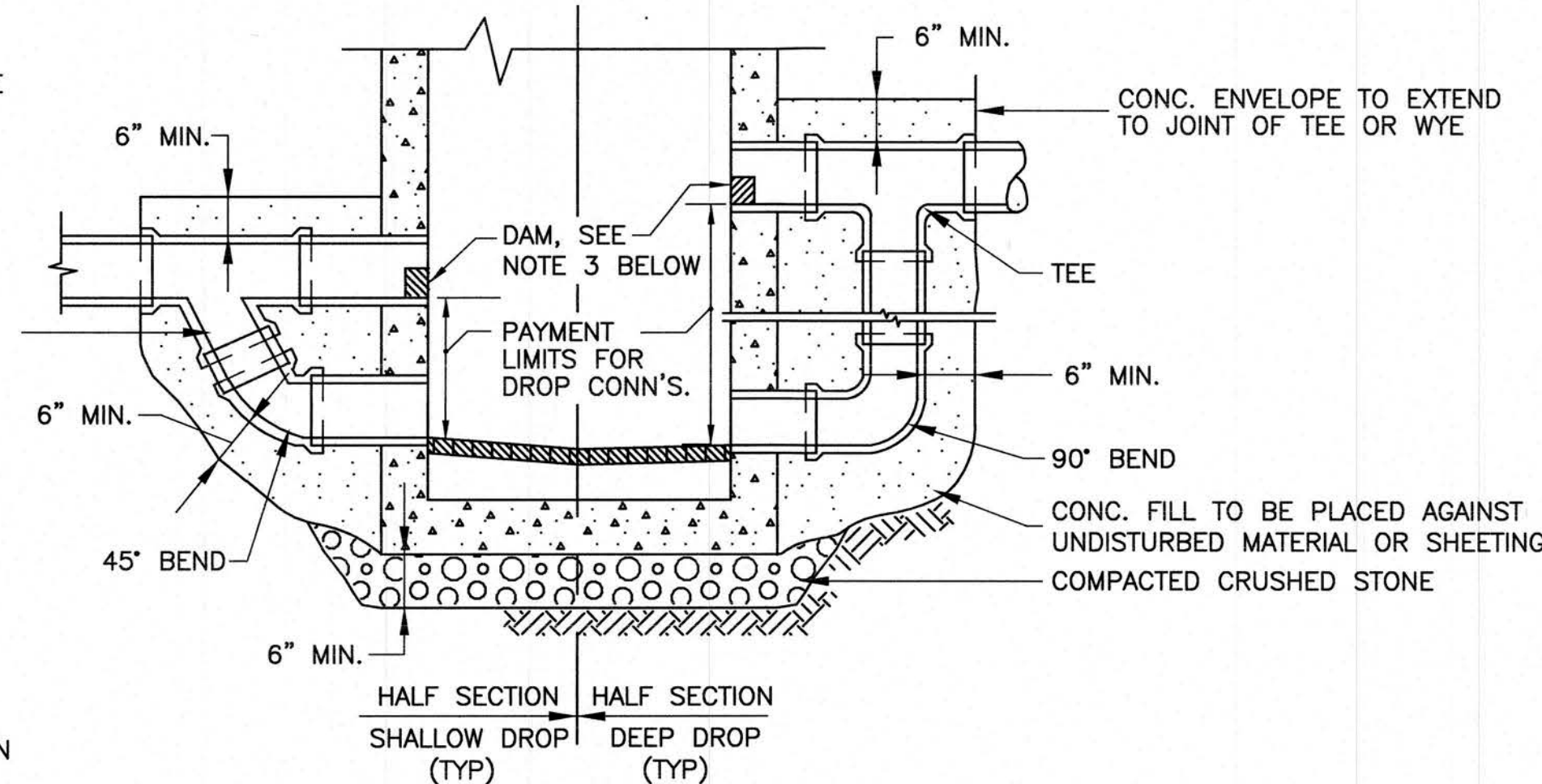
TEE MANHOLE DETAIL
N.T.S.



UTILITY CROSSING DETAIL
N.T.S.

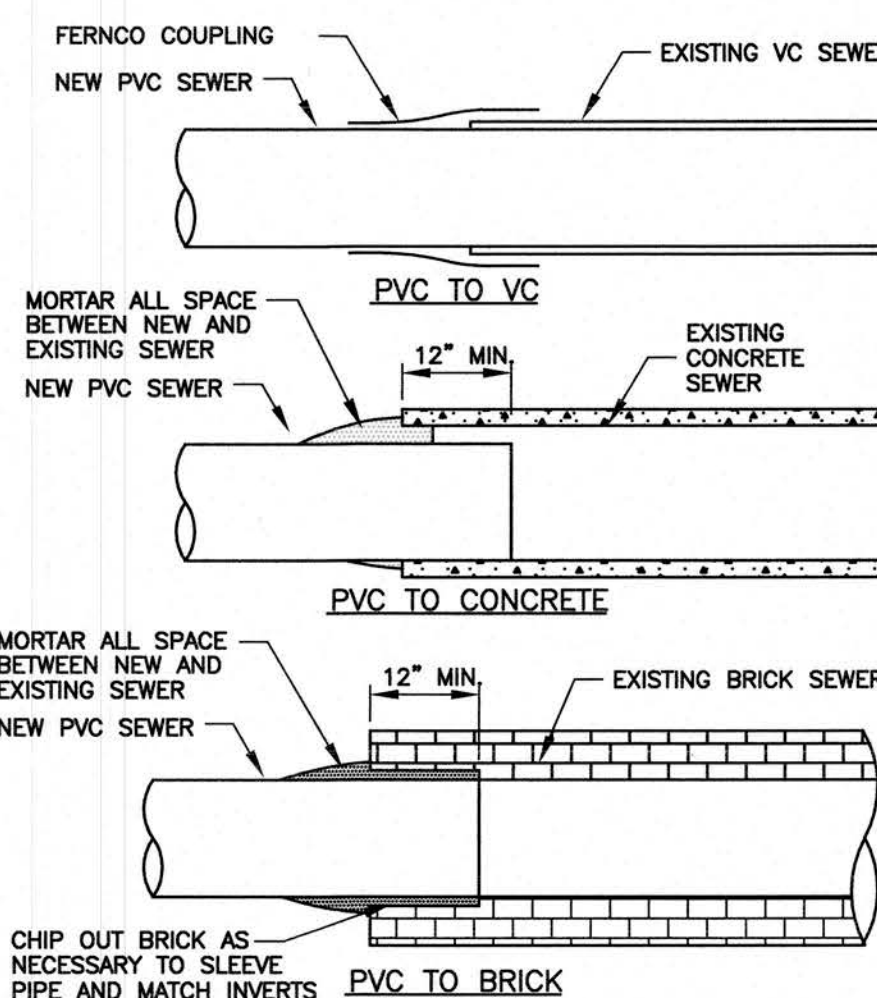


GRAVITY SEWER & DRAIN IN SAME TRENCH DETAIL
EXCAVATION AND PAYMENT LIMITS
N.T.S.

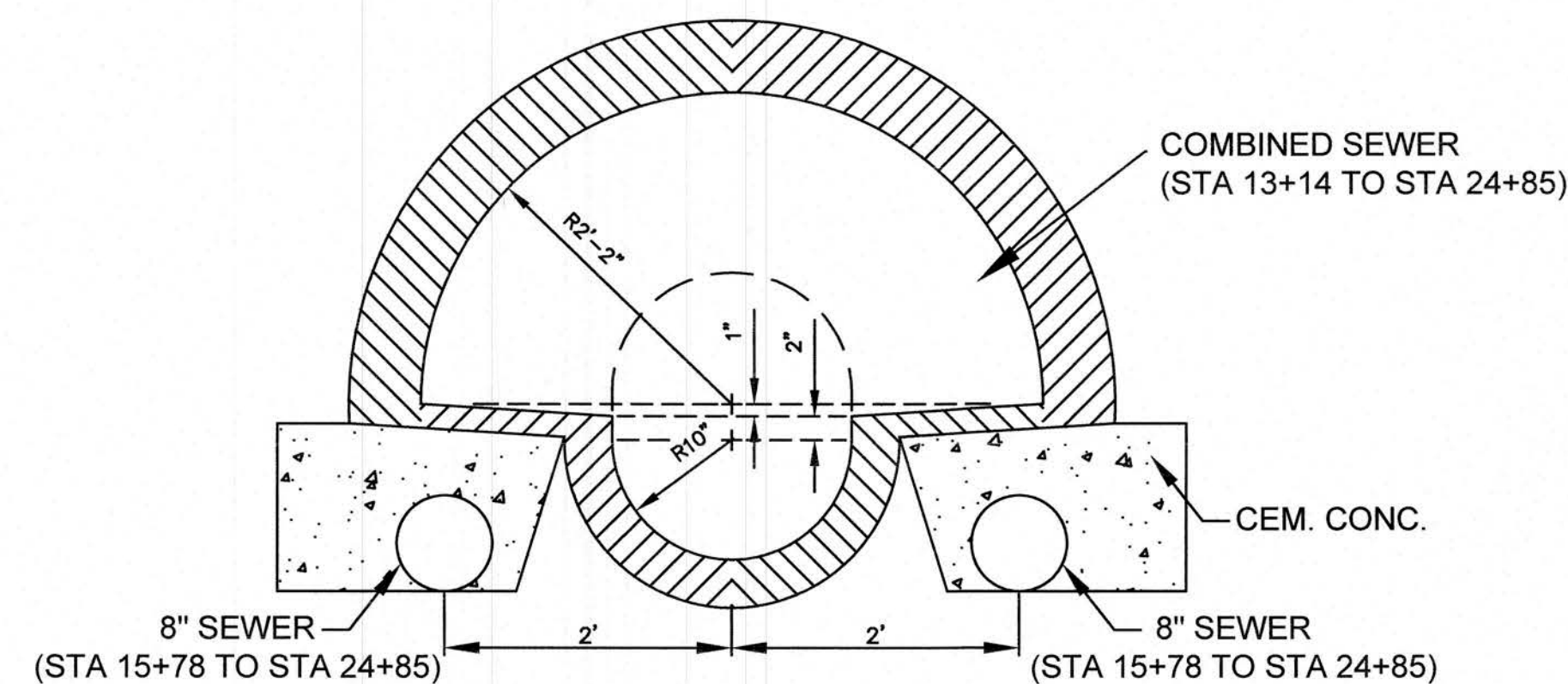


- NOTES:
1. DROP PIPE TO BE SAME DIAMETER AS SEWER DISCHARGE INTO MANHOLE UNLESS OTHERWISE SHOWN ON DRAWINGS.
 2. DIMENSIONS & CONSTRUCTION OF DROP MANHOLE TO BE SIMILAR TO TYPICAL MANHOLE EXCEPT AS SHOWN.
 3. FOR PVC PIPE, EPOXY HALF PLUG TO PIPE. FOR DI, VC AND RC PIPE, MORTAR AND BRICK IN PIPE.

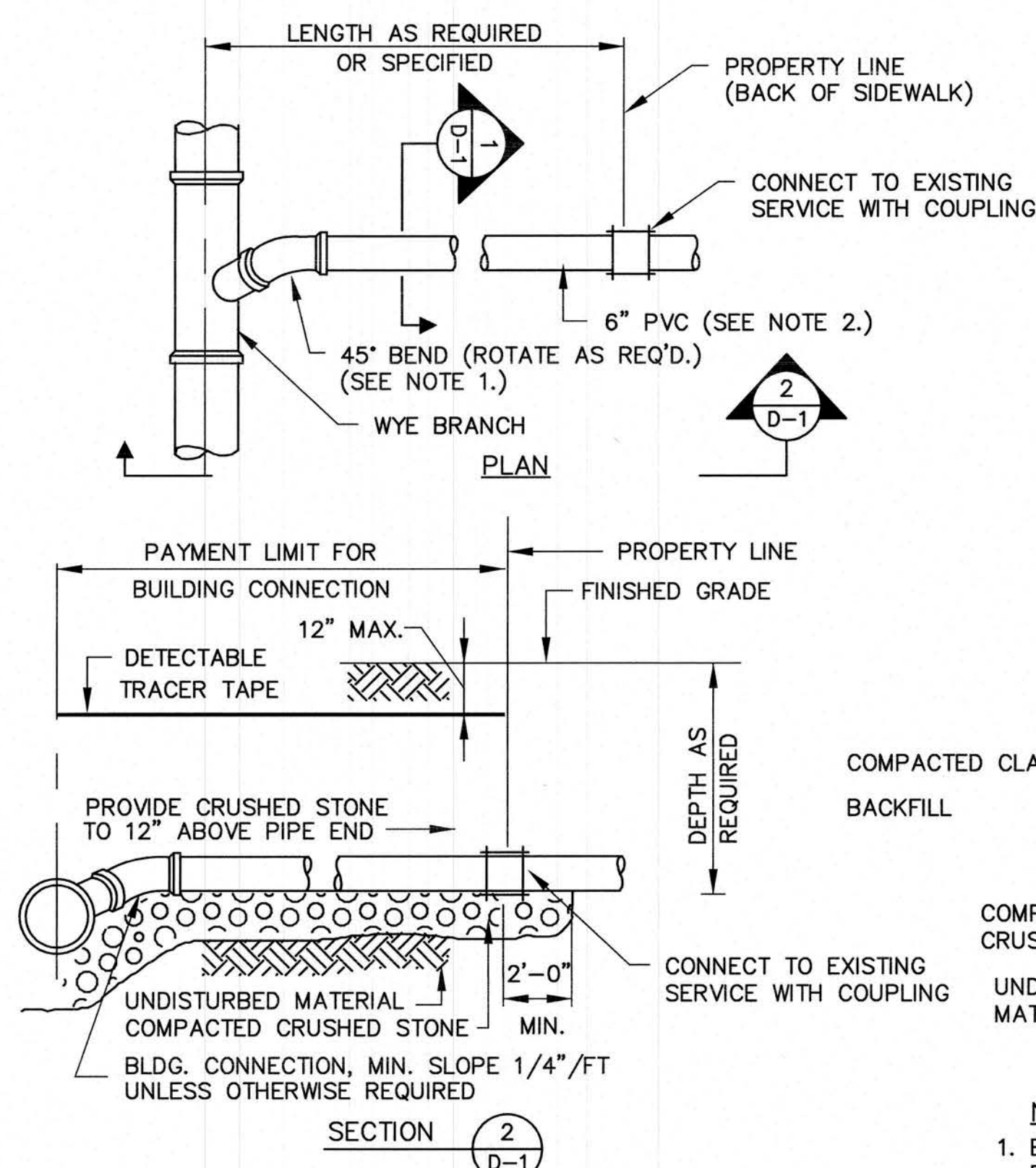
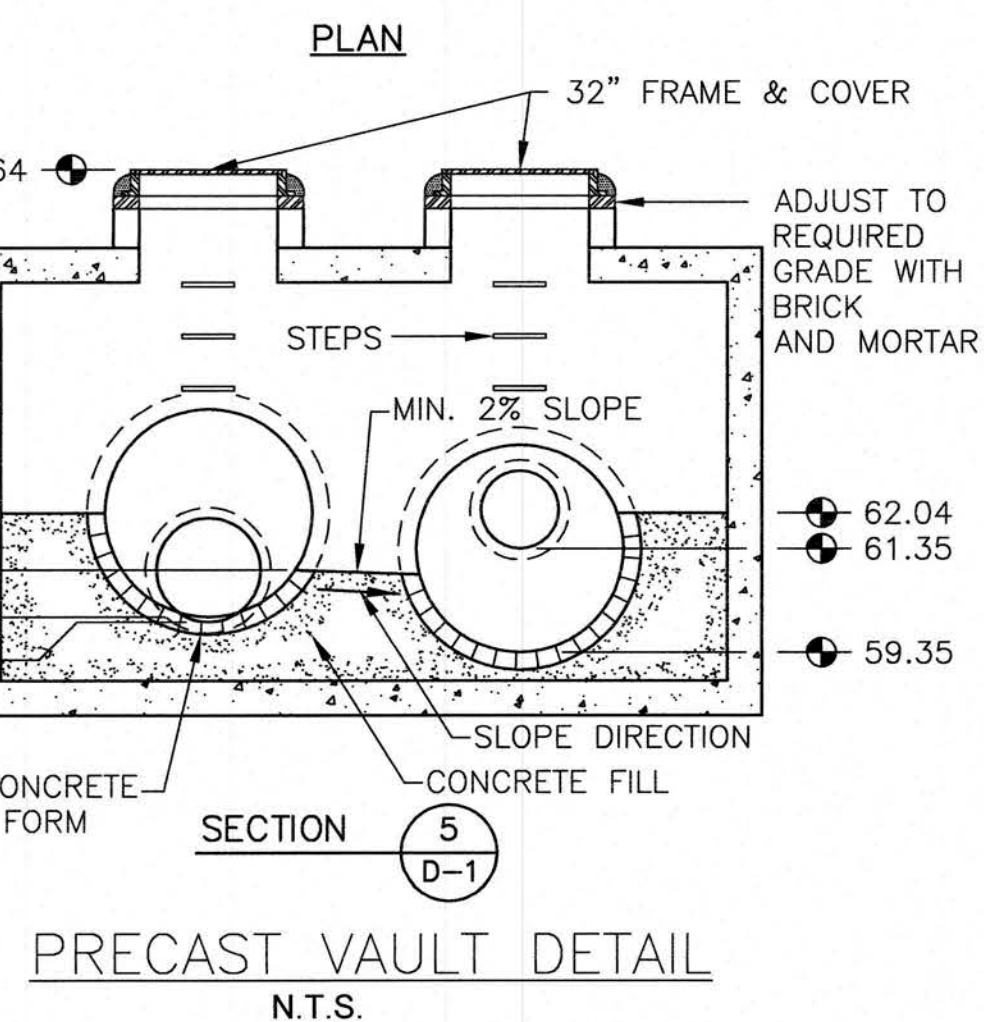
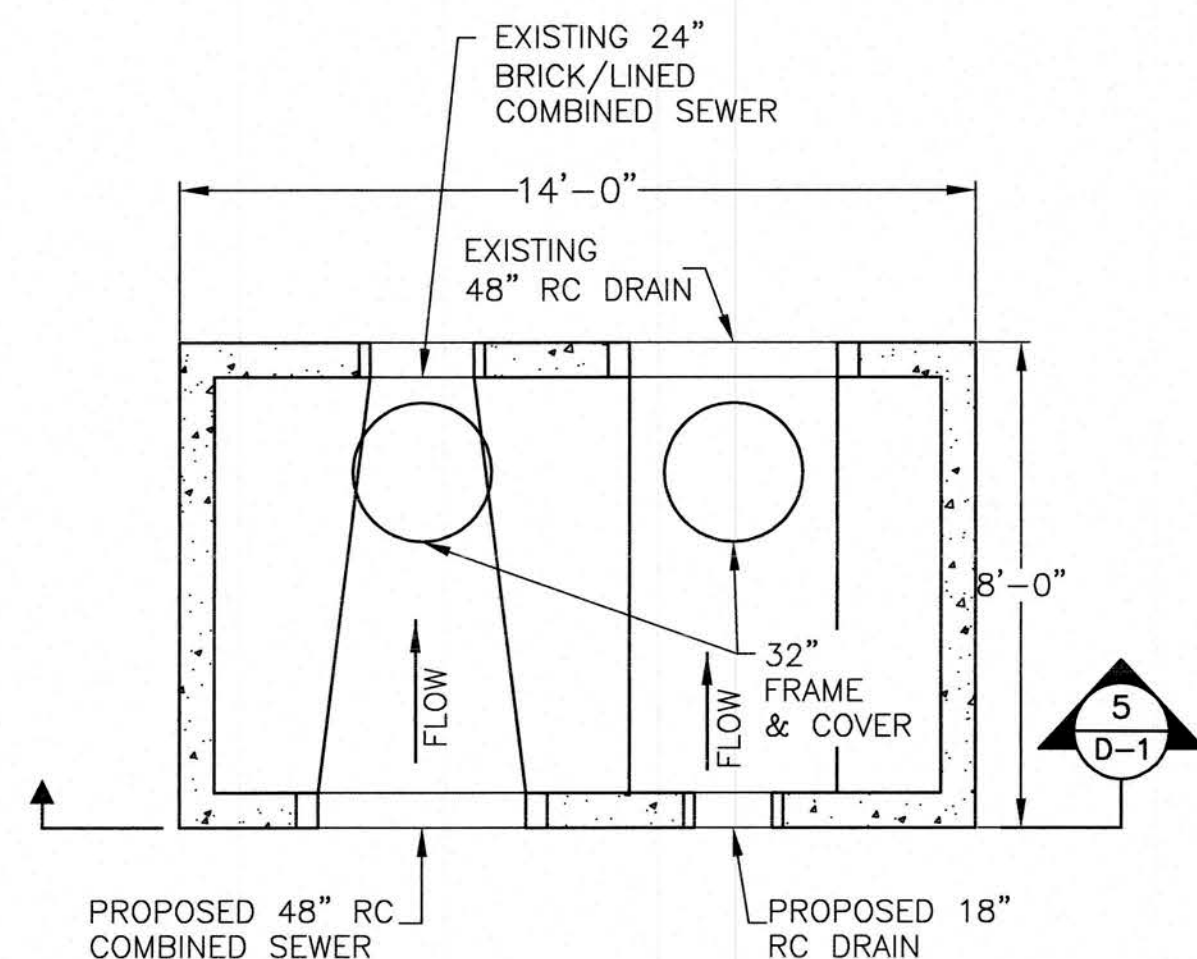
DROP CONNECTION DETAIL
N.T.S.



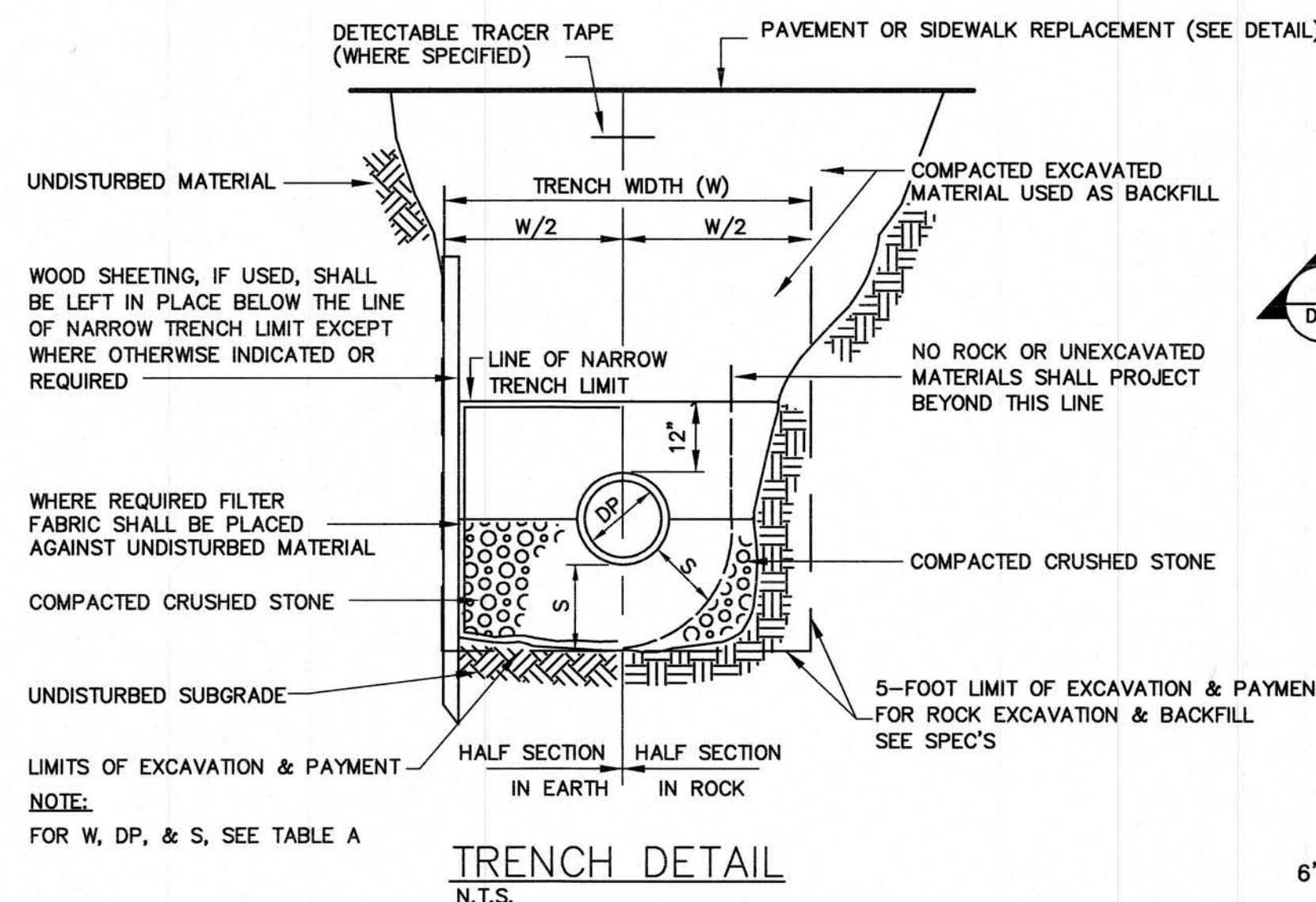
MANHOLE LATERAL CONNECTION DETAILS
N.T.S.



EXISTING SEWER/COMBINED SEWER DETAIL (CEDAR ST)
(AT CEDAR STREET)
N.T.S.

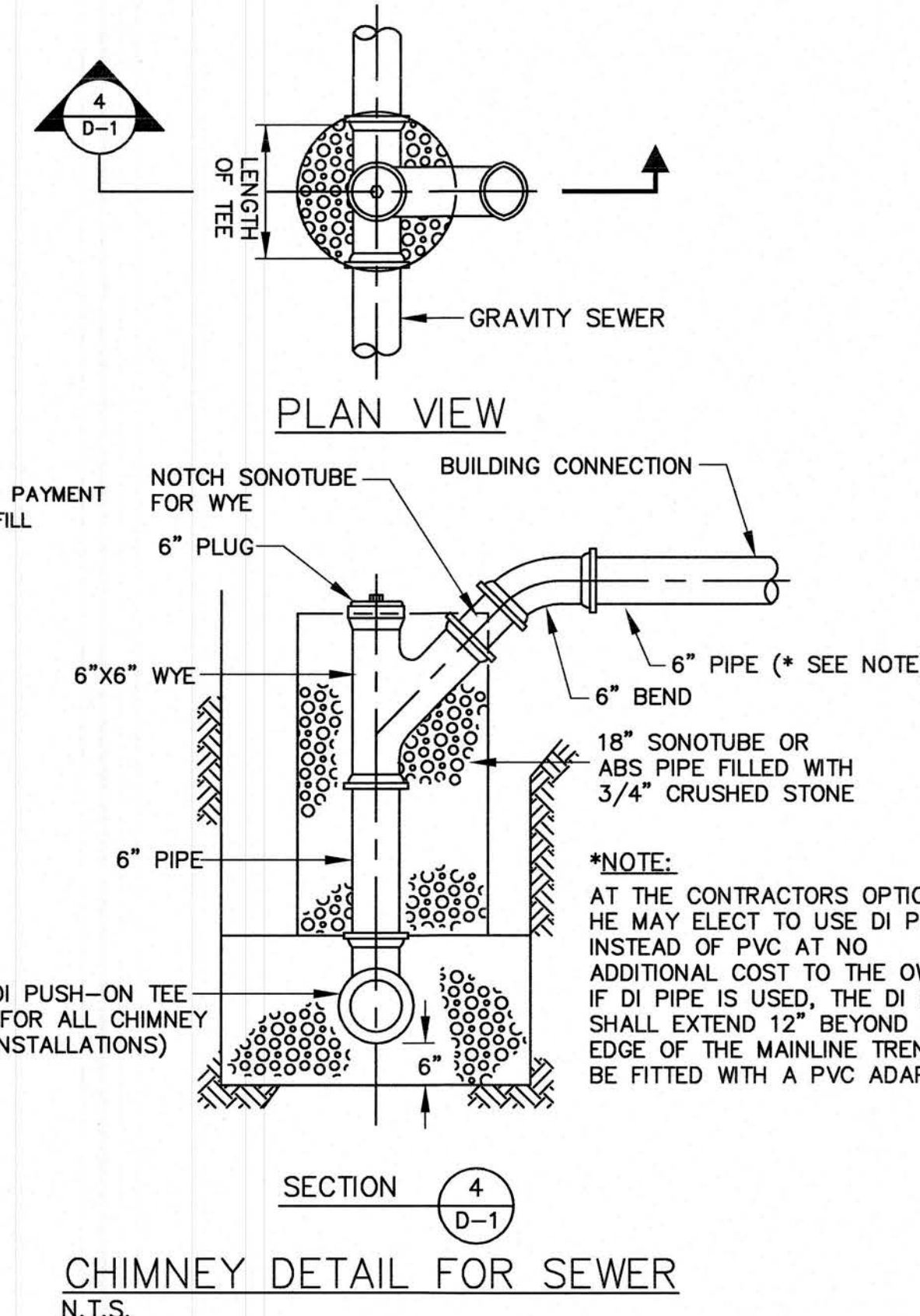


TYPICAL BUILDING CONNECTION DETAIL
N.T.S.



DEPTH TO INVERT	DIAMETER OF PIPE (DP)	MAXIMUM TRENCH WIDTH BELOW LINE OF NARROW TRENCH LIMIT (SHEETED OR UNSHEETED) (W)	MINIMUM CLEARANCE (S)
0-12'	TO 18"	5'	6"
0-12'	21"-24"	5'	7-1/2"
0-12'	27"-36"	6'	9"
0-12'	42"-48"	7'	9"
OVER 12'	TO 18"	7'	6"
OVER 12'	21"-24"	7'	7-1/2"
OVER 12'	27"-36"	8'	9"
OVER 12'	42"-48"	9'	9"

TABLE A



CHIMNEY DETAIL FOR SEWER
N.T.S.