

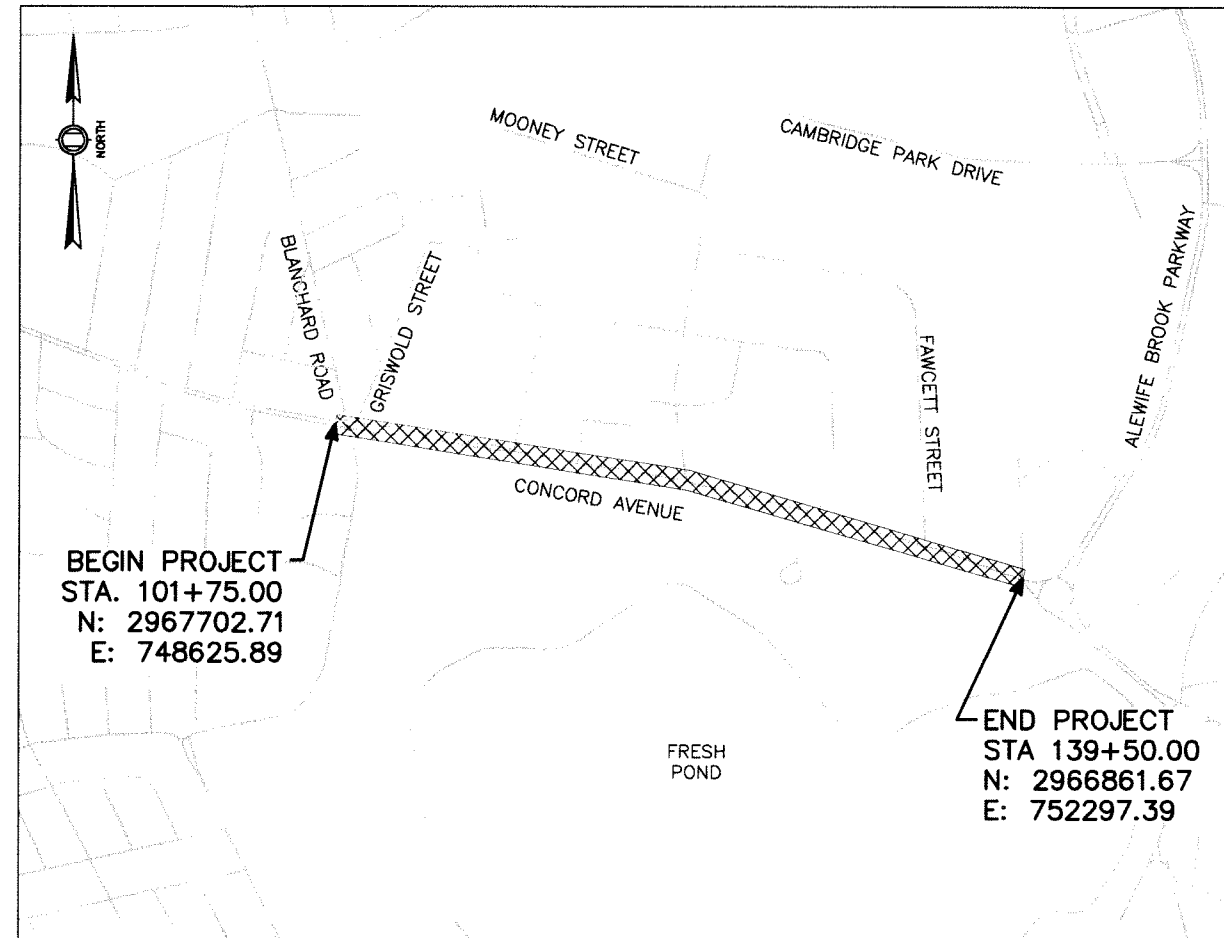
# CITY OF CAMBRIDGE, MASSACHUSETTS

## WATER MAIN & ROADWAY IMPROVEMENTS TO

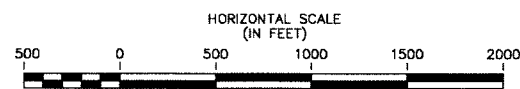
# CONCORD AVENUE

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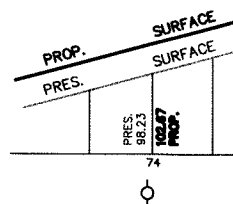
LOCATION MAP



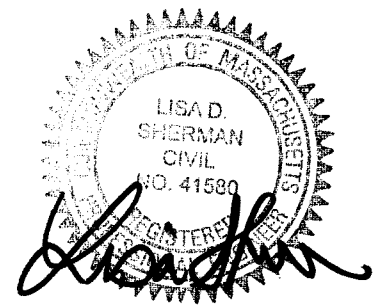
LENGTH OF PROJECT = 3,775 FT (0.71 MILES)

### CONVENTIONAL SYMBOLS

COUNTY, CITY, OR TOWN BOUNDARY	-----
COUNTY, CITY OR TOWN SIDE LINE	-----
FENCE LINE	----- X ----- X -----
BASE LINE OR SURVEY LINE	----- N57° 18' 41"E ----- 74 PC ----- 59.57 -----
RIGHT OF WAY LINE	-----
CULVERT	-----



ELEVATIONS .....  
POLE .....



1-19-10

DESIGNED BY: A. HEALEY  
DRAWN BY: A. HEALEY  
SHEET CHK'D BY: L. SHERMAN  
CROSS CHK'D BY: K. JOHNSON  
APPROVED BY: L. SHERMAN  
DATE: JANUARY 2010

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CITY OF CAMBRIDGE, MASSACHUSETTS  
DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

**CONCORD AVENUE  
WATER MAIN AND ROADWAY RECONSTRUCTION**

COVER SHEET

PROJECT NO. 0139-68660  
FILE NAME: CSTCS001

SHEET NO.

1

Accession No: 0139-P-xxxx

REV. NO.	DATE	DRWN	CHKD	REMARKS

**GENERAL SYMBOLS**

**ABBREVIATIONS**

**GENERAL NOTES**

**EXISTING**

**PROPOSED**

<p>□ CB (GI, LB)                  □ CBCI (GICI)                  □ CBMS                  □ DCB (CI)</p> <hr/> <p>○ EHH                  ○ EMH                  ○ TMH                  ○ WMH                  ○ SMH                  ○ DMH                  ○ GG                  ○ WG                  ○ CS                  √ Hyd                  □ FA                  ○ PM                  ☆ LP                  -○ UP                  -○ Guy                  — D 12" CMP                  — S 8" VC                  — E                  — G 12" LP                  — W 12" DIP                  — T                  □ MB                  □ MHB, SB, CB                  LABEL/DATE                  LABEL/DATE                  TRAV 6                  △ N 12-12-30 E</p>	<p>□ CB                  □ CBCI (GICI)                  □ CBMS                  □ DCB (CI)</p> <hr/> <p>○ EHH                  ○ EMH                  ○ TMH                  ○ WMH                  ○ SMH                  ○ DMH                  ○ GG                  ○ WG                  ○ CS                  √ Hyd                  □ FA                  ○ PM                  ☆ LP                  -○ UP                  -○ Guy                  — D 8M-12" RCP                  — S 5M-8" PVC                  — E                  — G 12" GAS                  — W 8" DIP                  — T                  ■ MB                  □ MHB, SB, CB                  LABEL/DATE                  LABEL/DATE</p> <hr/> <p>55+00                  S 56-23-15 W</p>	<p>CATCH BASIN (MUNICIPAL STANDARD)                  CATCH BASIN (GUTTER INLET OR LEACHING BASIN)                  CATCH BASIN (GUTTER INLET) WITH CURB INLET                  CATCH BASIN (MUNICIPAL STANDARD)                  DOUBLE CATCH BASIN (WITH CURB INLET)                  CURB (BERM) TYPE NOTED                  EDGE OF PAVEMENT                  ELECTRIC HANDHOLE (NUMBER AS NOTED)                  ELECTRIC MANHOLE                  TELEPHONE MANHOLE                  WATER MANHOLE                  SEWER MANHOLE                  DRAINAGE MANHOLE                  GAS GATE                  WATER GATE                  CURB STOP                  HYDRANT                  FIRE ALARM BOX                  PARKING METER                  STREET LIGHT                  UTILITY POLE                  GUY POLE                  DRAIN PIPE (DOUBLE LINE 24" &amp; OVER)                  SEWER MAIN                  ELECTRIC DUCT                  GAS MAIN                  WATER MAIN                  TELEPHONE DUCT                  MAIL BOX                  HIGHWAY GUARD (TYPE NOTED)                  FENCE (SIZE &amp; TYPE NOTED)                  HIGHWAY / PROPERTY BOUND (TYPE NOTED)                  CITY, TOWN OR COUNTY LAYOUT                  STATE HIGHWAY LAYOUT (S.H.L.O.)                  EASEMENT LINE                  PROPERTY LINE                  CITY, TOWN OR COUNTY BOUNDARY                  TOE OF SLOPE                  SURVEY TRAVERSE                  CONSTRUCTION BASELINE                  WHEELCHAIR RAMP                  WHEELCHAIR RAMP (ONE WAY)                  TREE (SIZE &amp; TYPE NOTED)                  BORINGS &amp; PAVEMENT CORES                  TEST PIT                  RETAINING WALL                  STUMP                  LIGHT POLE AND PENDENT LUMINAIRE                  LIGHT POLE AND RESIDENTIAL LUMINAIRE                  LIGHT POLE AND TWIN RESIDENTIAL LUMINAIRE                  WETLAND FLAGGING                  100' WETLAND BUFFER LINE                  HAYBALE AND SILT FENCE</p>
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**GENERAL**

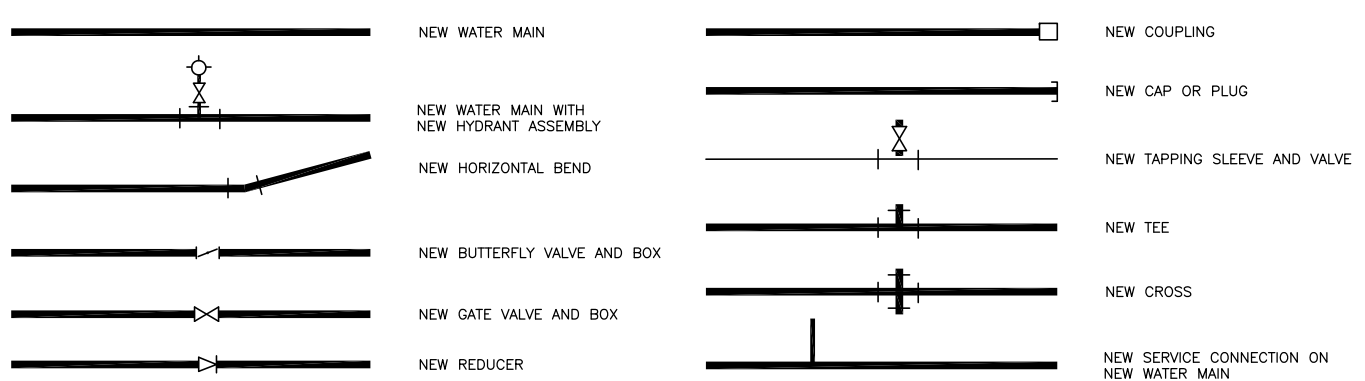
BO	BY OTHERS
PROP	PROPOSED
MIN	MINIMUM
MAX	MAXIMUM
ABAN	ABANDON
ADJ	ADJUST
REM	REMOVE & DISPOSE
RET	RETAIN
REMOD	REMODEL
EXIST	EXISTING
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
R&D	REMOVE AND DISCARD
ELEV	ELEVATION
FDN	FOUNDATION
BOS	BOTTOM OF SLOPE
TOS	TOP OF SLOPE
GC	GRANITE CURB
GE	GRANITE EDGING
SGC	SLOPED GRANITE CURB
BC	BITUMINOUS CURB
BB	BITUMINOUS BERM
CC	CONCRETE CURB
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
APPROX	APPROXIMATE
TYP	TYPICAL
PSB	PLANTABLE SOIL BORROW
PAVT	PAVEMENT
LOP	LIMIT OF PAVING
PGL	PROFILE GRADE LINE
HES	HIGH EARLY STRENGTH
HMA	HOT MIX ASPHALT
CLO	CITY LAYOUT
PTH	PLANIMETER TO HERE
REB	REBUILD
CPO	COLD PLANE AND OVERLAY

**UTILITIES**

CIT	CHANGE IN TYPE
F&G	FRAME AND GRATE
F&C	FRAME AND COVER
RCP	REINFORCED CONCRETE PIPE
PVC	POLY-VINYL-CHLORIDE PIPE
CI	CAST IRON PIPE
DI	DUCTILE IRON PIPE
ACCOMP	ASPHALT COATED CORRUGATED METAL PIPE
CAP	CORRUGATED ALUMINUM PIPE
HYD	HYDRANT
INV	INVERT ELEVATION
PWW	PAVED WATER WAY
UP	UTILITY POLE
TSV&B	TAPPING SLEEVE, VALVE & BOX
COND	CONDUIT
HDPE	HIGH DENSITY POLYETHYLENE PIPE

- PLANS PREPARED BY CAMP DRESSER AND MCKEE, INC. (CDM) ARE BASED ON SURVEY PROVIDED BY CHAPPELL ENGINEERING ASSOCIATES, LLC. OF MARLBOROUGH, MA. THE LOCATION AND SIZE OF EXISTING PIPES, DUCTS, CONDUITS AND OTHER UNDERGROUND STRUCTURES SHOWN ON THE DRAWINGS ARE NOT WARRANTED TO BE EXACT NOR IS IT WARRANTED THAT ALL UNDERGROUND STRUCTURES, UTILITIES AND SERVICE CONNECTIONS ARE SHOWN. CONTRACTOR SHALL NOTIFY UTILITY COMPANIES IN WRITING AND BY CALLING DIG SAFE (1-888-344-7233) BEFORE EXCAVATION. CONTRACTOR SHALL BEAR FULL RESPONSIBILITY FOR LOCATING ALL EXISTING UTILITIES PRIOR TO EXCAVATION THROUGHOUT THE ENTIRE CONSTRUCTION DURATION.
- PROPERTY LINE INFORMATION IS COMPILED FROM FIELD OBSERVATIONS, CITY LAYOUT PLANS, CITY ASSESSORS PLANS, AND PLANS RECORDED AT THE MIDDLESEX COUNTY REGISTRY OF DEEDS.
- THE BEARING SYSTEM FOR THIS PLAN IS BASED UPON MASSACHUSETTS STATE PLAIN GRID. GRID NORTH WAS ESTABLISHED FROM GPS READINGS ON NOVEMBER 11, 2008.
- VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)
- HORIZONTAL DATUM: NORTH AMERICAN DATUM OF 1983 (NAD83)
- ALL BASELINE TIES FOR CORNERS AND RADII OF CURB OR EDGING ARE TO THE P.C.'S OR P.T.'S, UNLESS OTHERWISE NOTED.
- ALL SIGNS TO BE REMOVED AND RESET OUTSIDE LIMITS OF WHEELCHAIR RAMPS UNLESS OTHERWISE NOTED OR AS DIRECTED BY THE ENGINEER.
- ALL TRAFFIC SIGNAL HARDWARE (INCLUDING MAST ARMS, PEDESTALS, CONTROLLER BOXES, PARKING METERS, LIGHT/UTILITY POLES, FENCES, STONE BOUNDS, GRANITE BOUNDS, AND OTHER PROPERTY MARKERS) ARE TO BE RETAINED. PULLBOXES ARE TO BE RETAINED AND ADJUSTED TO GRADE.
- ALL EXISTING HARDWARE AND SIDEWALK FURNITURE IS TO BE REMOVED AND RESET UNLESS OTHERWISE NOTED OR DIRECTED BY THE ENGINEER.
- THE CONTRACTOR SHALL SAWCUT TO THE FULL PAVEMENT DEPTH AT LOCATIONS WHERE NEW FULL DEPTH PAVEMENT OR NEW SIDEWALK MEETS EXISTING PAVEMENT OR SIDEWALK, AT THE LOCATIONS SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER.
- ALL AREAS OUTSIDE OF THE LIMIT OF WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED TO THEIR ORIGINAL CONDITION BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE CITY OF CAMBRIDGE, MASSACHUSETTS.
- THE CONTRACTOR SHALL RESTORE THE EXISTING SURFACE PAVEMENTS AND TURF DISTURBED BY THE PROPOSED WORK AND SHALL PATCH ALL HOLES RESULTING FROM THE REMOVAL OF FOUNDATIONS WITH MATERIALS SIMILAR TO EXISTING MATERIALS.
- EXISTING TREES WITHIN THE LIMIT OF WORK (RET. AND PROTECT) SHALL BE PROTECTED UNLESS DIRECTED OTHERWISE BY ENGINEER.
- AT THE LIMITS OF RECONSTRUCTION, CONTRACTOR SHALL SAW CUT AND MATCH EXISTING LINE AND GRADE OF; ALL SURFACES, CURBS, PAVEMENT MARKINGS
- CONTRACTOR SHALL NOT BE REIMBURSED FOR WORK OUTSIDE THE LIMITS OF WORK SHOWN ON THE DRAWINGS.
- CONTRACTOR IS TO USE CAUTION WHEN GRADING UNDER BRIDGES. PROPOSED GRADES MUST NOT CREATE A MORE RESTRICTIVE VERTICAL CLEARANCE AND MUST NOT ADVERSELY EFFECT REMOVAL OF STORMWATER RUNOFF FROM THE ROADWAY.
- EXISTING PAVEMENT MARKINGS TO BE REMOVED AND REPLACED WITH THERMOPLASTIC UNLESS OTHERWISE DIRECTED BY THE ENGINEER OR AS INDICATED ON THE PLANS.
- MATCH GRADE AT WALKS AND DRIVES UNLESS OTHERWISE DIRECTED BY THE ENGINEER OR AS INDICATED ON THE PLANS.
- ALL GRANITE CURB, EDGING, AND CURB CORNERS THAT ARE REMOVED SHALL BE RESET OR DISCARDED AS DIRECTED BY THE ENGINEER. GRANITE CURB OR EDGING TO BE RESET SHALL NOT BE RANDOMLY MIXED WITH NEW CURB, BUT SHALL BE RESET SO AS TO GIVE A UNIFORM APPEARANCE. CURB AND CURB CORNERS WHICH CANNOT BE REUSED SHALL BE DISCARDED BY THE CONTRACTOR. CURB INLETS SHALL NOT BE REUSED.
- ALL PROPOSED GRANITE CURB SHALL BE TYPE VB, UNLESS OTHERWISE NOTED.
- ALL PROPOSED WHEELCHAIR RAMPS ARE TO BE CEMENT CONCRETE AND SHALL CONFORM TO LATEST AAB AND ADA WHEELCHAIR RAMP STANDARDS.
- A MINIMUM 36" PATH OF TRAVEL (EXCLUDING CURB) SHALL BE MAINTAINED BY ALL OBSTRUCTIONS (EXISTING RELOCATED, AND PROPOSED) ON THE SIDEWALK INCLUDING, BUT NOT LIMITED TO, UTILITY POLES, HYDRANTS, SIGNS, SIGNALS, LIGHT POLES, TREES AND MAILBOXES. IF THERE IS A CONFLICT, THE INFORMATION SHALL BE FURNISHED TO THE ENGINEER FOR RESOLUTION PRIOR TO SIDEWALK RECONSTRUCTION.
- ALL EXISTING CURB STOPS, VALVE BOXES, CASTINGS AND HYDRANTS, WHICH ARE TO REMAIN, IN AREAS TO BE REPAVED SHALL BE ADJUSTED TO LINE AND GRADE BY THE CONTRACTOR, UNLESS OTHERWISE DIRECTED BY ENGINEER.
- THE CONTRACTOR SHALL VERIFY ALL OUTLET GRADES OF DRAINAGE STRUCTURES PRIOR TO CONSTRUCTING ANY DRAINAGE MODIFICATIONS.
- WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
- THE CONTRACTOR SHALL ADJUST ALL UTILITY FRAMES AND COVERS AS REQUIRED. CONTRACTOR TO ARRANGE FOR INSPECTION OF ALL WORK ON UTILITIES WITH THE APPROPRIATE UTILITY COMPANY. IN THE EVENT ANY UTILITY COMPANY DOES NOT ALLOW THE CONTRACTOR TO MAKE THE ADJUSTMENTS, THE CONTRACTOR SHALL COORDINATE HIS WORK TO ALLOW FOR THE ADJUSTMENTS TO BE MADE BY THE UTILITY OR ITS DESIGNEE. THE EXPECTED UTILITIES INCLUDE: GAS, ELECTRIC, TELEPHONE, CATV AND FIRE.
- EXACT LOCATION OF EXISTING WATER MAINS, VALVES, HYDRANTS, SERVICE CONNECTIONS AND OTHER APPURTENANCES ARE TO BE DETERMINED BY THE CONTRACTOR BEFORE EXCAVATION. UNLESS SPECIFICALLY SHOWN, LOCATIONS OF VERTICAL BENDS ARE NOT SHOWN ON THE DRAWINGS. PRIOR TO CONSTRUCTION, CONTRACTOR SHALL REVIEW WATER MAIN INFORMATION AT THE CAMBRIDGE WATER DEPARTMENT OFFICE TO LOCATE EXISTING WATER SYSTEM APPURTENANCES. IT IS NOT WARRANTED THAT ALL EXISTING WATER SYSTEM APPURTENANCES ARE SHOWN ON THE SURVEY. CONTRACTOR CAN REVIEW EXISTING WATER SYSTEM INFORMATION DURING NORMAL BUSINESS HOURS AT THE CAMBRIDGE WATER DEPARTMENT OFFICE, 250 FRESH POND PARKWAY, CAMBRIDGE, MA (617-349-4770).
- CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND APPROVALS REQUIRED TO PERFORM THE WORK, INCLUDING ALL PERMITS REQUIRED BY THE CAMBRIDGE WATER DEPARTMENT AND CAMBRIDGE DEPARTMENT OF PUBLIC WORKS.
- PRIOR TO THE START OF CONSTRUCTION, CONTRACTOR SHALL COORDINATE ANY UTILITY RELOCATIONS WITH THE CAMBRIDGE DEPARTMENT OF PUBLIC WORKS AND ALL RESPECTIVE UTILITY AGENCIES. LOCATIONS FOR RELOCATED UTILITIES ARE TO BE DETERMINED BY THE RESPECTIVE UTILITY AGENCY IN CONSULTATION WITH THE CAMBRIDGE DEPARTMENT OF PUBLIC WORKS.

**PROPOSED (WATER MAIN CONSTRUCTION)**



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. GALLANT  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: M. GALLANT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**GENERAL LEGENDS, ABBREVIATIONS, & NOTES**

PROJECT NO. 0139-68660  
 FILE NAME: CSTAB001  
 SHEET NO. 2  
 Accession No: 0139-P-xxxx

**GENERAL NOTES (CONT.)**

- 30. CONTRACTOR SHALL PROVIDE A MINIMUM OF 72 HOURS NOTICE PRIOR TO STARTING ANY CONSTRUCTION. IT MAY BE NECESSARY TO PERFORM WATER MAIN CONSTRUCTION WORK DURING PERIODS OTHER THAN NORMAL WORKING HOURS FOR THE PURPOSE OF OBTAINING SHUT DOWNS AND/OR TO FACILITATE THE INSTALLATION OF NEW WORK. THE CONTRACTOR SHALL COORDINATE ALL WORK TO BE PERFORMED OUTSIDE NORMAL WORKING HOURS WITH THE CAMBRIDGE WATER DEPARTMENT, CAMBRIDGE DEPARTMENT OF PUBLIC WORKS AND CAMBRIDGE POLICE AND FIRE DEPARTMENTS.
- 31. THE CAMBRIDGE WATER DEPARTMENT WILL BE RESPONSIBLE FOR OPERATION OF ALL EXISTING VALVES, HYDRANTS, SERVICE CONNECTIONS AND OTHER WATER SYSTEM APPURTENANCES. CONTRACTOR SHALL NOTIFY THE CAMBRIDGE WATER DEPARTMENT AT LEAST A WEEK IN ADVANCE TO EXERCISE AND TEST VALVES PRIOR TO SHUTDOWN; WRITTEN NOTIFICATION TO IMPACTED ABUTTERS 72 HOURS IN ADVANCE.
- 32. CONTRACTOR SHALL INTERRUPT WATER SERVICE AND DISRUPT THE NORMAL FUNCTIONING OF THE DISTRIBUTION SYSTEM AS LITTLE AS POSSIBLE. THE NEW 16 INCH WATER MAIN SHALL BE INSTALLED, TESTED, AND DISINFECTED AS SPECIFIED WHILE THE EXISTING WATER MAINS AND SERVICE CONNECTIONS REMAIN ACTIVE. EXISTING SERVICE CONNECTIONS SHALL THEN BE TRANSFERRED TO THE NEW 16 INCH WATER MAIN. ONCE ALL SERVICES AND WATER MAINS HAVE BEEN TRANSFERRED TO THE NEW 16 INCH MAIN, THE EXISTING PIPES SHALL BE ABANDONED. CONTRACTOR SHALL COORDINATE ALL TEMPORARY SHUT DOWNS OF EXISTING WATER MAINS AND SERVICE CONNECTIONS WITH THE CAMBRIDGE WATER DEPARTMENT AND EACH AFFECTED USER. CONTRACTOR IS FURTHER ADVISED THAT THERE ARE SENSITIVE USERS IN THIS AREA, AND SHALL ENDEAVOR TO MINIMIZE DISRUPTION OF THEIR WATER SERVICE.
- 33. ALL HYDRANTS ARE TO BE COMPATIBLE WITH EQUIPMENT USED BY THE CAMBRIDGE FIRE DEPARTMENT. THE CONTRACTOR SHALL COORDINATE THIS REQUIREMENT WITH THE SPECIFICATIONS AND WITH THE CAMBRIDGE FIRE DEPARTMENT. CONTRACTOR SHALL COVER ANY HYDRANTS TAKEN OUT OF SERVICE WITH BAGS CLEARLY LABELED 'NOT IN SERVICE' OR 'OUT OF SERVICE' AND SHALL NOTIFY THE CAMBRIDGE WATER DEPARTMENT AND FIRE DEPARTMENT OF ANY HYDRANT NOT IN SERVICE.
- 34. THE CAMBRIDGE WATER DEPARTMENT RESERVES THE RIGHT TO LIMIT THE AMOUNT OF EXISTING WATER MAINS AND HYDRANTS WHICH MAY BE OFFLINE OR OUT OF SERVICE AT ANY TIME DURING CONSTRUCTION. THE SAFETY AND INTEGRITY OF THE WATER DISTRIBUTION SYSTEM IS OF PRIME IMPORTANCE.
- 35. CONTRACTOR SHALL SAW CUT ALL EXISTING PAVEMENT PRIOR TO EXCAVATION FOR INSTALLATION OF NEW WATER MAINS, INCLUDING REINFORCED CONCRETE SUBBASE, IF ENCOUNTERED, TO ITS FULL DEPTH. BORING LOGS THAT DOCUMENT EXISTING PAVEMENT AND SOIL CONDITIONS ARE PROVIDED IN THE CONTRACT DOCUMENTS. CONTRACTOR IS ADVISED THAT A REINFORCED CONCRETE SUBBASE EXISTS BELOW THE PAVEMENT IN MUCH OF THE PROJECT AREA.
- 36. WHERE INOPERABLE SIDE LINE VALVES PREVENT WATER MAIN SHUT DOWNS FOR NEW WATER MAIN CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE A TEST PIT, CUT INTO THE EXISTING WATER MAIN AND INSERT A TEMPORARY CAP OR PLUG. ALL OF THIS WORK SHALL BE PAID FOR UNDER THE RESPECTIVE ITEMS FOR TEST PITS AND DI FITTINGS ON THE BID FORM.
- 37. CONTRACTOR SHALL REMOVE AND DISPOSE OF EXISTING WATER MAINS AND APPURTENANCES NECESSARY TO MAKE REQUIRED CONNECTIONS. ALL EXISTING WATER MAINS TO BE ABANDONED SHALL BE DRAINED AND CAPPED/PLUGGED. ABANDONED WATER MAINS SHALL NOT REMAIN UNDER PRESSURE. CONTRACTOR SHALL REMOVE ALL EXISTING VALVE BOXES AND COVERS FOR EXISTING VALVES ON WATER MAINS TO BE ABANDONED IN PLACE THROUGHOUT THE ENTIRE PROJECT AREA.
- 38. ALL EXISTING WATER PIPE, VALVES, HYDRANTS, SERVICE CONNECTIONS AND APPURTENANCES REMOVED SHALL BE DISPOSED OF BY THE CONTRACTOR IN FULL ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS.
- 39. INSTALL NEW PIPES, VALVES, FITTINGS AND HYDRANTS AS SHOWN ON THE DRAWINGS. THE MINIMUM BURY DEPTH FOR NEW WATER MAINS SHALL BE AT LEAST 5 FEET. APPROXIMATE LOCATIONS OF EXISTING UTILITIES WHICH CROSS THESE NEW WATER MAINS ARE SHOWN ON THE DRAWINGS. LOCATIONS OF NEW WATER MAINS MAY BE ADJUSTED BY THE ENGINEER TO AVOID CONFLICTS WITH OTHER UTILITIES OR BASED ON FIELD CONDITIONS ENCOUNTERED DURING CONSTRUCTION. HYDRANTS SHALL BE INSTALLED AT THE BACK EDGE (PROPERTY SIDE) OF ALL SIDE WALKS IN SUCH A LOCATION SO AS TO ALLOW FOR COMPLETE TURNING OF A STANDARD HYDRANT WRENCH. THE CAMBRIDGE FIRE DEPARTMENT SHALL BE CONTACTED BY THE CONTRACTOR TO APPROVE ANY FIELD ADJUSTMENTS TO PROPOSED HYDRANT LOCATIONS.
- 40. CONTRACTOR SHALL MAINTAIN A MINIMUM VERTICAL CLEARANCE OF AT LEAST 12 INCHES BETWEEN NEW WATER MAINS AND ALL OTHER UTILITIES EXCEPT SANITARY SEWERS. CONTRACTOR SHALL MAINTAIN AN 18 INCH MINIMUM VERTICAL CLEARANCE BETWEEN THE BOTTOM OF NEW WATER MAINS AND THE CROWN OF ANY SEWER WHEN THE WATER MAIN IS LAID WITHIN 10 FEET EDGE TO EDGE OF THE SEWER OR DRAIN. TO THE EXTENT POSSIBLE, THE CONTRACTOR SHALL MAINTAIN A MINIMUM 10 FOOT LATERAL SEPARATION BETWEEN NEW WATER MAINS AND ANY EXISTING SEWER, EXCEPT WHEN IT IS NECESSARY TO CROSS AN EXISTING SEWER OR UNLESS OTHERWISE DIRECTED BY THE ENGINEER. THE HORIZONTAL DISTANCE BETWEEN NEW WATER MAINS AND ALL OTHER UTILITIES SHALL BE AT LEAST 3 FEET.
- 41. NEW WATER MAINS SHALL PASS UNDER ALL EXISTING UTILITIES EXCEPT SEWERS, UNLESS OTHERWISE DIRECTED BY THE ENGINEER. IF WATER MAINS MUST CROSS UNDER SEWERS, THE NEW WATER MAIN SHALL BE CONCRETE ENCASED BY THE CONTRACTOR. TO THE EXTENT POSSIBLE, THE CONTRACTOR SHALL INSTALL ONE FULL LENGTH OF NEW WATER PIPE CENTERED BELOW THE SEWER CROSSING SO THAT THE WATER MAIN JOINTS WILL BE AS FAR AWAY FROM THE SEWER AS POSSIBLE. WATER MAINS THAT MUST CROSS UNDER EXISTING SEWERS SHALL BE CONSTRUCTED OF MECHANICAL JOINT PIPE, RESTRAINED AS NECESSARY. THE CROWN OF ANY NEW WATER MAIN THAT MUST CROSS UNDER AN EXISTING SEWER AT MINIMUM SHOULD BE 18 INCHES BELOW THE INVERT OF THE SEWER.
- 42. UNLESS SPECIFICALLY SHOWN, NEW DUCTILE-IRON VERTICAL BENDS ARE NOT SHOWN ON THE DRAWINGS. CONTRACTOR SHALL INSTALL VERTICAL BENDS OF THE NECESSARY SIZE REQUIRED TO CROSS EXISTING UTILITIES AND TO COMPLETE ALL REQUIRED CONNECTIONS BASED ON FIELD CONDITIONS ENCOUNTERED.
- 43. ALL NEW WATER MAIN FITTINGS AND VALVES SHALL BE RESTRAINED AS SPECIFIED. MINIMUM THRUST RESTRAINT REQUIREMENTS FOR WATER MAIN CONSTRUCTION ARE SHOWN ON THE DRAWINGS.
- 44. ALL NEW VALVES IN STREET INTERSECTIONS SHALL BE CONNECTED DIRECTLY TO NEW CROSSES AND TEES, UNLESS OTHERWISE SHOWN ON THE DRAWINGS OR DIRECTED BY THE ENGINEER OR CAMBRIDGE WATER DEPARTMENT.
- 45. CONTRACTOR SHALL REMOVE AND DISPOSE OF EXISTING HYDRANTS WHERE AND AS SHOWN ON THE DRAWINGS.
- 46. CONTRACTOR SHALL USE CAUTION AND TAKE CARE TO AVOID DAMAGE TO ALL EXISTING UTILITIES AND SERVICES DURING CONSTRUCTION. CONTRACTOR SHALL PROTECT AND SUPPORT ALL EXISTING UTILITIES DURING THE INSTALLATION OF NEW WATER MAINS, VALVES, HYDRANTS, SERVICES AND APPURTENANCES. ANY DAMAGE RESULTING FROM THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED BY HIM/HER AT HIS/HER EXPENSE AND AT NO ADDITIONAL COST TO THE CITY OF CAMBRIDGE.
- 47. CONTRACTOR SHALL REPLACE SERVICE CONNECTIONS AS SHOWN ON THE DRAWINGS AND AS SPECIFIED. EXISTING SERVICE CONNECTIONS SHALL BE REPLACED WITH A NEW CORPORATION STOP, COPPER SERVICE TUBING, CURB STOP AND FITTINGS AND ADAPTERS OF THE NECESSARY SIZE REQUIRED AND AT LEAST EQUAL TO THE EXISTING SERVICE CONNECTION SIZE. THE MINIMUM SIZE OF ALL NEW SERVICE CONNECTIONS IS ONE INCH. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, EXISTING SERVICE CONNECTIONS ARE TO REMAIN AND SHALL BE CONNECTED TO NEW WATER MAINS BY THE CONTRACTOR. THE LOCATION OF EXISTING SERVICE CONNECTIONS IS PROVIDED FOR CONVENIENCE ONLY. IT IS NOT WARRANTED THAT ALL EXISTING SERVICE CONNECTIONS ARE SHOWN ON THE DRAWINGS. THIS DOES NOT RELIEVE THE CONTRACTOR OF DETERMINING THE LOCATION OF SERVICE CONNECTIONS TO BE RECONNECTED TO NEW WATER MAINS. CONTRACTOR SHALL ENSURE THAT ALL EXISTING SERVICE CONNECTIONS, WHETHER OR NOT THEY ARE SHOWN ON THE DRAWINGS, HAVE BEEN TRANSFERRED AND PROPERLY ACTIVATED/SUPPLIED BY THE NEW WATER MAINS. CONTRACTOR SHALL COORDINATE THIS REQUIREMENT WITH THE CAMBRIDGE WATER DEPARTMENT.
- 48. CONTRACTOR SHALL VERIFY ALL EXISTING WATER MAINS AND SERVICES TO BE ABANDONED WITH THE CAMBRIDGE WATER DEPARTMENT.
- 49. ALL NEW MATERIALS FOR WATER SYSTEM CONSTRUCTION SHALL BE AS SPECIFIED AND BE OF THE TYPE CURRENTLY USED BY THE CAMBRIDGE WATER DEPARTMENT. ALL MATERIALS SHALL BE INSTALLED AS SPECIFIED.
- 50. AS SHOWN ON THE DRAWINGS, THE NEW 16" WATER MAIN IN CONCORD AVENUE SHALL BE INSTALLED WITHIN THE LIMITS OF THE BIKE PATH ON THE SOUTH SIDE OF CONCORD AVENUE. CONTRACTOR SHALL INSTALL NEW WATER MAINS AS SPECIFIED AND AS SHOWN ON THE DRAWINGS. WATER MAIN TRENCHES SHALL BE BACKFILLED AND COMPACTED AND THE PAVEMENT SUBBASE RESTORED AS SPECIFIED AND AS SHOWN ON THE DRAWINGS. CONTRACTOR SHALL FURNISH AND INSTALL TEMPORARY TRENCH-WIDTH PAVEMENT FOR ALL WATER MAIN TRENCHES. FINAL PAVEMENT, SIDEWALK AND LANDSCAPE RESTORATION SHALL BE COMPLETED AS PART OF THE CONCORD AVENUE ROADWAY RESTORATION PART OF THIS CONTRACT.
- 51. THE CAMBRIDGE WATER DEPARTMENT WILL PROVIDE A SOURCE OF SUPPLY FROM THE EXISTING TREATED WATER DISTRIBUTION SYSTEM FOR CONTRACTOR'S USE IN FILLING AND FLUSHING WATER MAINS. AN AIR BREAK SHALL BE MAINTAINED AT ALL TIMES BETWEEN THE DISTRIBUTION SYSTEM AND CONTRACTOR'S EQUIPMENT TO PREVENT CROSS-CONNECTION. CONTRACTOR SHALL PROVIDE A SUITABLE MEANS OF BACKFLOW PREVENTION TO PREVENT CROSS-CONNECTION. THE MEANS AND METHODS EMPLOYED FOR BACKFLOW PREVENTION ARE SUBJECT TO THE REVIEW AND APPROVAL OF THE CAMBRIDGE WATER DEPARTMENT. CONTRACTOR SHALL ALSO PROVIDE MEANS OF MEASURING THE TOTAL VOLUME OF WATER USED FOR CONSTRUCTION PURPOSES (FLUSHING, PRESSURE/LEAKAGE TESTS, DISINFECTION, FILLING LINES, ETC). EVIDENCE OF CALIBRATION SHALL BE FURNISHED BY CONTRACTOR FOR ANY METERING DEVICES. CONTROLLER SHALL NOT KNOWINGLY ALLOW WATER TO LEAK OR RUN TO UNNECESSARY WASTE. THE CAMBRIDGE WATER DEPARTMENT RESERVES THE RIGHT TO LIMIT THE QUANTITY OF WATER PROVIDED TO THE CONTRACTOR AT NO COST FOR CONSTRUCTION PURPOSES.
- 52. ANY EXISTING TRAFFIC SIGNAL EQUIPMENT SCHEDULED TO BE RETAINED (INCLUDING CONDUIT AND LOOP DETECTORS) DAMAGED BY CONTRACTOR'S ACTIVITIES SHALL BE REPLACED IN KIND AT NO ADDITIONAL COST.

MINIMUM THRUST RESTRAINT REQUIREMENTS					
FITTING TYPE	FITTING SIZE	RESTRAINT LENGTH (FEET)	THRUST BLOCK BEARING AREA (SQUARE FEET)	THRUST BLOCK VOLUME (CUBIC FEET)	
HORIZONTAL BENDS	16"-1/4	78	22	N/A	
	16"-1/8	32	12	N/A	
	16"-1/16	15	6	N/A	
	16"-1/32	8	3	N/A	
	12"-1/4	61	12	N/A	
	12"-1/8	25	7	N/A	
	12"-1/16	12	4	N/A	
	12"-1/32	6	2	N/A	
	10"-1/4	52	9	N/A	
	10"-1/8	22	5	N/A	
	10"-1/16	10	3	N/A	
	10"-1/32	5	2	N/A	
	8"-1/4	43	6	N/A	
	8"-1/8	18	3	N/A	
	8"-1/16	9	2	N/A	
	8"-1/32	4	1	N/A	
	6"-1/4	33	3	N/A	
	6"-1/8	14	2	N/A	
	6"-1/16	7	1	N/A	
	6"-1/32	3	1	N/A	
	4"-1/4	24	2	N/A	
	4"-1/8	10	1	N/A	
	4"-1/16	5	1	N/A	
	4"-1/32	2	1	N/A	
	TEES	16"x16"	166	16	N/A
		16"x12"	128	9	N/A
16"x10"		109	6	N/A	
16"x8"		89	4	N/A	
16"x6"		67	3	N/A	
16"x4"		45	1	N/A	
12"x12"		129	9	N/A	
12"x10"		109	6	N/A	
12"x8"		90	4	N/A	
12"x6"		68	3	N/A	
12"x4"		46	1	N/A	
10"x10"		110	6	N/A	
10"x8"		90	4	N/A	
10"x6"		69	3	N/A	
10"x4"		47	1	N/A	
8"x8"		90	4	N/A	
8"x6"		69	3	N/A	
8"x4"		47	1	N/A	
6"x6"		69	3	N/A	
6"x4"		48	1	N/A	
REDUCERS		16"x12"	71	7	N/A
		16"x10"	99	10	N/A
		16"x8"	122	12	N/A
		16"x6"	141	13	N/A
		16"x4"	154	15	N/A
		12"x10"	38	3	N/A
	12"x8"	69	5	N/A	
	12"x6"	94	7	N/A	
	12"x4"	113	8	N/A	
	10"x8"	37	3	N/A	
	10"x6"	68	4	N/A	
	10"x4"	90	5	N/A	
	8"x6"	38	2	N/A	
	8"x4"	66	3	N/A	
	6"x4"	36	2	N/A	
	VALVES / CAPS / PLUGS	16"	167	16	N/A
12"		130	9	N/A	
10"		111	6	N/A	
8"		91	4	N/A	
6"		71	3	N/A	
VERTICAL OFFSETS / BENDS (UPPER BEND)	4"	50	1	N/A	
	16"-1/8	69	5	267	
	16"-1/16	33	2	145	
	16"-1/32	16	1	74	
	12"-1/8	54	3	150	
	12"-1/16	26	1	82	
	12"-1/32	13	1	42	
	10"-1/8	46	2	105	
	10"-1/16	22	1	57	
	10"-1/32	11	1	29	
	8"-1/8	38	2	67	
	8"-1/16	18	1	37	
	8"-1/32	9	1	19	
	6"-1/8	29	1	38	
	6"-1/16	14	1	21	
	6"-1/32	7	1	11	
VERTICAL OFFSETS / BENDS (LOWER BEND)	4"-1/8	21	1	17	
	4"-1/16	10	1	10	
	4"-1/32	5	1	5	
	16"-1/8	32	5	267	
	16"-1/16	15	2	145	
	16"-1/32	8	1	74	
	12"-1/8	25	3	150	
	12"-1/16	12	1	82	
	12"-1/32	6	1	42	
	10"-1/8	22	2	105	
	10"-1/16	10	1	57	
	10"-1/32	5	1	29	
	8"-1/8	18	2	67	
	8"-1/16	9	1	37	
	8"-1/32	4	1	19	
	6"-1/8	14	1	38	
6"-1/16	7	1	21		
6"-1/32	3	1	11		
4"-1/8	10	1	17		
4"-1/16	5	1	10		
4"-1/32	2	1	5		

**WATER MAIN THRUST RESTRAINT TABLES**

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. GALLANT  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: M. GALLANT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

**CDM**  
 56 Exchange Terrace  
 Providence, RI 02903  
 Tel: (401) 751-5360  
 consulting • engineering • construction • operations

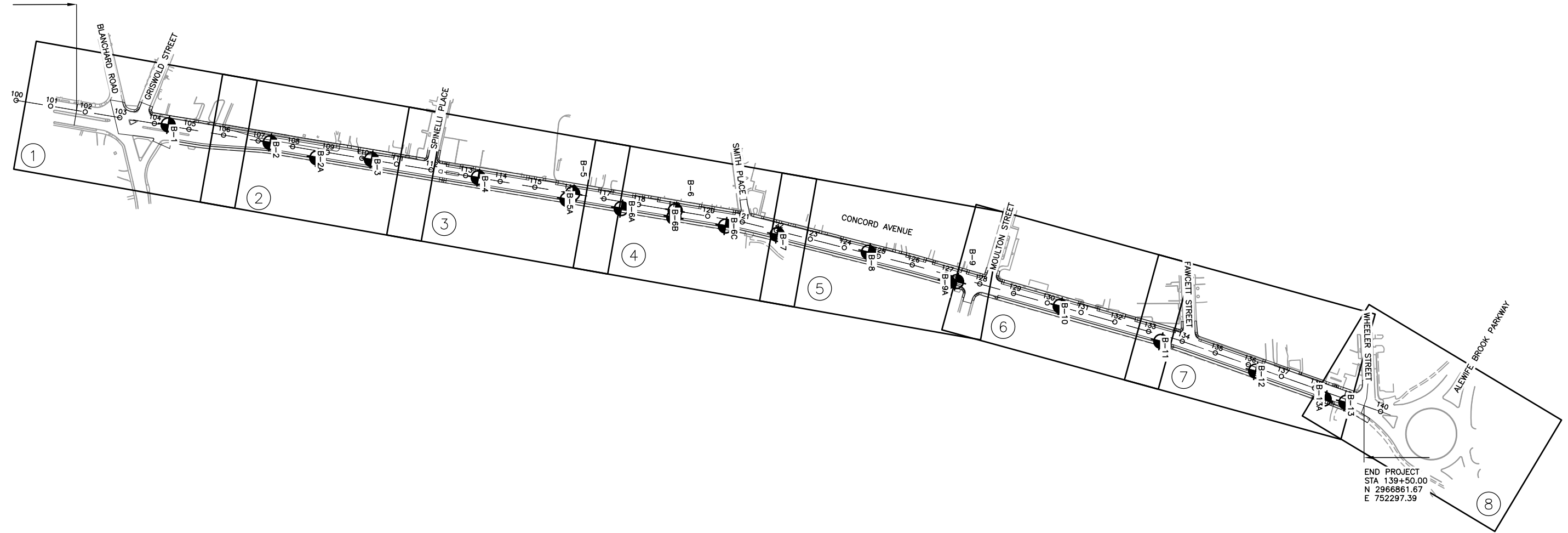
CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**GENERAL LEGENDS, ABBREVIATIONS, & NOTES (CONT.)**

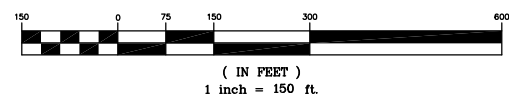


BEGIN PROJECT  
 STA 101+75.00  
 N 2967702.71  
 E 748625.69



END PROJECT  
 STA 139+50.00  
 N 2966861.67  
 E 752297.39

GRAPHIC SCALE



LEGEND:

- BORING LOCATION
- B-X

	1	2	3	4	5	6	7	8
DRAWING TITLE:	SHEET NUMBER:							
Water Main Construction Plans	22	23	24	25	26	27	28	29
Roadway Construction Plans	30	31	32	33	34	35	36	37
Landscaping Plans	38	39	40	-	-	-	-	-
Grading Plans	48	49	50	51	52	53	54	55
Pavement Marking & Signing Plans	57	58	59	60	61	62	63	64

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. MURPHY  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

KEY PLAN & BORING LOCATIONS

PROJECT NO. 0139-68660  
 FILE NAME: CSTPK001

SHEET NO.  
**4**

Accession No: 0139-P-xxxx



(603) 437-1610 New Hampshire Boring, Inc. P.O. Box 165 Derry, NH 03038 E-Mail: nhb@nhboring.com Fax: (603) 437-0034

Boring # B-6A Project: Water Main and Rotary Reconstruction Cambridge, Ma. - Camp Dresser & McKee, Inc. Project # 90451  
 Project Address: Concord Avenue City: Cambridge State: Ma Zip:  
 Date Start: 11-23-09 Date End: 11-23-09 Location: See Plan

Casing: HSA Sampler: S/S Casing: 4-1/4" ID Sampler: 1-3/8 in. I.D. Type: Hammer Fall: 140 lbs. Size: 30 in.

GROUNDWATER OBSERVATION								
Date:	Depth:	Casing:				Stabilization Period		
11-23-09	None Encountered	DP	S/#	DEPTH	PEN	REC	BLOWS/6"	
		S/C	SAMPLE DESCRIPTION					
-	-	S-1	1'-3"	24"	13"	28-15-12-11	5"	ASPHALT
-	-	-	-	-	-	-	-	Dry, medium dense, brown, coarse to medium SAND, little fine gravel, trace clay.
5'0"	-	S-2	5'-7"	24"	7"	6-25-17-16	-	Moist, dense, brown, medium to fine SAND, little fine gravel, trace inorganic silt and clay.
-	-	-	-	-	-	-	-	-
10'0"	-	S-3	9'-11"	24"	10"	13-14-17-12	11"	Wet, dense, brown, coarse to fine SAND, little fine gravel, trace inorganic silt.
-	-	-	-	-	-	-	-	Bottom of Exploration = 11'
15'0"	-	-	-	-	-	-	-	-
20'0"	-	-	-	-	-	-	-	-
25'0"	-	-	-	-	-	-	-	-
30'0"	-	-	-	-	-	-	-	-

Drillers: Peter Labossiere Helper: Jack Lefebvre Inspector:  
 Remarks:  
 S/#: Sample PEN: Penetration REC: Recovery S/C: Strata Change

(603) 437-1610 New Hampshire Boring, Inc. P.O. Box 165 Derry, NH 03038 E-Mail: nhb@nhboring.com Fax: (603) 437-0034

Boring # B-6B Project: Water Main and Rotary Reconstruction Cambridge, Ma. - Camp Dresser & McKee, Inc. Project # 90451  
 Project Address: Concord Avenue City: Cambridge State: Ma Zip:  
 Date Start: 11-23-09 Date End: 11-23-09 Location: See Plan

Casing: HSA Sampler: S/S Casing: 4-1/4" ID Sampler: 1-3/8 in. I.D. Type: Hammer Fall: 140 lbs. Size: 30 in.

GROUNDWATER OBSERVATION								
Date:	Depth:	Casing:				Stabilization Period		
11-23-09	None Encountered	DP	S/#	DEPTH	PEN	REC	BLOWS/6"	
		S/C	SAMPLE DESCRIPTION					
-	-	S-1	1'-3"	24"	14"	14-12-11-8	6"	ASPHALT
-	-	-	-	-	-	-	-	Dry, medium dense, brown, coarse to medium SAND, little fine gravel, trace inorganic silt.
5'0"	-	S-2	5'-7"	24"	12"	6-4-5-7	-	Dry, loose, brown, coarse to fine SAND, some fine gravel, little inorganic silt.
-	-	-	-	-	-	-	-	-
10'0"	-	S-3	9'-10"	12"	12"	4-3	10"	Dry, loose, brown, organic coarse to fine SAND, trace fine gravel, trace clay.
-	-	S-3A	10'-11"	12"	12"	2-2	11"	Dry, very loose, Silty PEAT.
-	-	-	-	-	-	-	-	Bottom of Exploration = 11'
15'0"	-	-	-	-	-	-	-	-
20'0"	-	-	-	-	-	-	-	-
25'0"	-	-	-	-	-	-	-	-
30'0"	-	-	-	-	-	-	-	-

Drillers: Peter Labossiere Helper: Jack Lefebvre Inspector:  
 Remarks:  
 S/#: Sample PEN: Penetration REC: Recovery S/C: Strata Change

(603) 437-1610 New Hampshire Boring, Inc. P.O. Box 165 Derry, NH 03038 E-Mail: nhb@nhboring.com Fax: (603) 437-0034

Boring # B-6C Project: Water Main and Rotary Reconstruction Cambridge, Ma. - Camp Dresser & McKee, Inc. Project # 90451  
 Project Address: Concord Avenue City: Cambridge State: Ma Zip:  
 Date Start: 11-23-09 Date End: 11-23-09 Location: See Plan

Casing: HSA Sampler: S/S Casing: 4-1/4" ID Sampler: 1-3/8 in. I.D. Type: Hammer Fall: 140 lbs. Size: 30 in.

GROUNDWATER OBSERVATION								
Date:	Depth:	Casing:				Stabilization Period		
11-23-09	-2"	DP	S/#	DEPTH	PEN	REC	BLOWS/6"	
		S/C	SAMPLE DESCRIPTION					
-	-	S-1	1'-3"	24"	12"	12-8-5-7	3"	ASPHALT
-	-	-	-	-	-	-	-	CONCRETE
5'0"	-	S-2	5'-7"	24"	6"	7-6-6-7	-	Wet, medium dense, brown, medium to fine SAND, little inorganic silt, trace fine gravel.
-	-	-	-	-	-	-	-	Wet, medium dense, brown, coarse GRAVEL, and medium to fine sand, trace silt.
10'0"	-	S-3	9'-11"	24"	2"	7-5-5-4	11"	Wet, loose, brown, medium to fine SAND.
-	-	-	-	-	-	-	-	Bottom of Exploration = 11'
15'0"	-	-	-	-	-	-	-	-
20'0"	-	-	-	-	-	-	-	-
25'0"	-	-	-	-	-	-	-	-
30'0"	-	-	-	-	-	-	-	-

Drillers: Peter Labossiere Helper: Jack Lefebvre Inspector:  
 Remarks:  
 S/#: Sample PEN: Penetration REC: Recovery S/C: Strata Change

(603) 437-1610 New Hampshire Boring, Inc. P.O. Box 165 Derry, NH 03038 E-Mail: nhb@nhboring.com Fax: (603) 437-0034

Boring # B-7 Project: Concord Avenue Roadway and Water Main Improvement - Camp Dresser & McKee, Inc. Project # 8501  
 Project Address: Concord Avenue City: Cambridge State: MA Zip:  
 Date Start: 04-06-09 Date End: 04-06-09 Location: See Plan

Casing: HW Sampler: S/S Casing: 4" Size: Sampler: 1-3/8 in. I.D. Type: Hammer Fall: 140 lbs. Size: 30 in.

GROUNDWATER OBSERVATION								
Date:	Depth:	Casing:				Stabilization Period		
04-06-09	None Encountered	DP	S/#	DEPTH	PEN	REC	BLOWS/6"	
		S/C	SAMPLE DESCRIPTION					
-	-	S-1	1'-3"	24"	4"	24-24-12-14	3-3"	ASPHALT
-	-	-	-	-	-	-	-	CONCRETE w/REBAR
5'0"	-	S-2	4'-5'10"	22"	14"	44-46-39	100/4"	S-1: Wet, dense, brown-black, fine to coarse SAND Trace to little inorganic silt, trace fine gravel.
-	-	-	-	-	-	-	-	S-2: Dry, very dense, fine to medium SAND, little inorganic silt.
10'0"	-	S-3	8'-10"	24"	2"	36-35-50-55	10"	S-3: Dry, very dense, coarse to fine SAND, some gravel, trace inorganic silt.
-	-	-	-	-	-	-	-	Bottom of Exploration = 10'
15'0"	-	-	-	-	-	-	-	-
20'0"	-	-	-	-	-	-	-	-
25'0"	-	-	-	-	-	-	-	-
30'0"	-	-	-	-	-	-	-	-

Drillers: Gregg Leavitt Helper: Gary Waitt Inspector:  
 Remarks:  
 S/#: Sample PEN: Penetration REC: Recovery S/C: Strata Change

(603) 437-1610 New Hampshire Boring, Inc. P.O. Box 165 Derry, NH 03038 E-Mail: nhb@nhboring.com Fax: (603) 437-0034

Boring # B-8 Project: Concord Avenue Roadway and Water Main Improvement - Camp Dresser & McKee, Inc. Project # 8501  
 Project Address: Concord Avenue City: Cambridge State: MA Zip:  
 Date Start: 04-02-09 Date End: 04-02-09 Location: See Plan

Casing: HW Sampler: S/S Casing: 4" Size: Sampler: 1-3/8 in. I.D. Type: Hammer Fall: 140 lbs. Size: 30 in.

GROUNDWATER OBSERVATION								
Date:	Depth:	Casing:				Stabilization Period		
04-02-09	None Encountered	DP	S/#	DEPTH	PEN	REC	BLOWS/6"	
		S/C	SAMPLE DESCRIPTION					
-	-	S-1	1'-3"	24"	14"	50-53-64-45	4-2"	ASPHALT
-	-	-	-	-	-	-	-	CONCRETE w/REBAR
5'0"	-	S-2	4'-6"	24"	12"	18-17-14-11	4"	S-1: Moist, very dense, brown, fine to coarse SAND, some inorganic silt, trace fine to coarse gravel.
-	-	-	-	-	-	-	-	S-2: Moist, hard, brown, inorganic SILT and fine to coarse SAND, little fine gravel.
10'0"	-	S-3	8'-10"	24"	12"	8-9-11-20	8"	S-3: Moist, very stiff, brown, inorganic SILT, some fine to medium sand.
-	-	-	-	-	-	-	-	Bottom of Exploration = 10'
15'0"	-	-	-	-	-	-	-	-
20'0"	-	-	-	-	-	-	-	-
25'0"	-	-	-	-	-	-	-	-
30'0"	-	-	-	-	-	-	-	-

Drillers: Gregg Leavitt Helper: Gary Waitt Inspector:  
 Remarks: Moved boring 1" away from center line due to traffic  
 S/#: Sample PEN: Penetration REC: Recovery S/C: Strata Change

(603) 437-1610 New Hampshire Boring, Inc. P.O. Box 165 Derry, NH 03038 E-Mail: nhb@nhboring.com Fax: (603) 437-0034

Boring # B-9 Project: Concord Avenue Roadway and Water Main Improvement - Camp Dresser & McKee, Inc. Project # 8501  
 Project Address: Concord Avenue City: Cambridge State: MA Zip:  
 Date Start: 04-03-09 Date End: 04-03-09 Location: See Plan

Casing: HW Sampler: S/S Casing: 4" Size: Sampler: 1-3/8 in. I.D. Type: Hammer Fall: 140 lbs. Size: 30 in.

GROUNDWATER OBSERVATION								
Date:	Depth:	Casing:				Stabilization Period		
04-03-09	None Encountered	DP	S/#	DEPTH	PEN	REC	BLOWS/6"	
		S/C	SAMPLE DESCRIPTION					
-	-	S-1	1'-3"	24"	17"	6-6-9-13	4"	ASPHALT
-	-	-	-	-	-	-	-	CONCRETE w/REBAR
5'0"	-	S-2	4'-6"	24"	15"	36-32-36-36	8"	Moist, stiff, tan, SILTY CLAY, trace fine sand.
-	-	-	-	-	-	-	-	Dry, very dense, tan, FINE SAND and INORGANIC SILT.
10'0"	-	S-3	8'-10"	24"	16"	13-15-20-25	8"	Dry, moist, dense, tan, FINE SAND, some inorganic silt.
-	-	-	-	-	-	-	-	Bottom of Exploration = 10'
15'0"	-	-	-	-	-	-	-	-
20'0"	-	-	-	-	-	-	-	-
25'0"	-	-	-	-	-	-	-	-
30'0"	-	-	-	-	-	-	-	-

Drillers: Gregg Leavitt Helper: Gary Waitt Inspector:  
 Remarks:  
 S/#: Sample PEN: Penetration REC: Recovery S/C: Strata Change

(603) 437-1610 New Hampshire Boring, Inc. P.O. Box 165 Derry, NH 03038 E-Mail: nhb@nhboring.com Fax: (603) 437-0034

Boring # B-9A Project: Water Main and Rotary Reconstruction Cambridge, Ma. - Camp Dresser & McKee, Inc. Project # 90451  
 Project Address: Concord Avenue City: Cambridge State: Ma Zip:  
 Date Start: 11-23-09 Date End: 11-23-09 Location: See Plan

Casing: HSA Sampler: S/S Casing: 4-1/4" ID Sampler: 1-3/8 in. I.D. Type: Hammer Fall: 140 lbs. Size: 30 in.

GROUNDWATER OBSERVATION								
Date:	Depth:	Casing:				Stabilization Period		
11-23-09	-2"	DP	S/#	DEPTH	PEN	REC	BLOWS/6"	
		S/C	SAMPLE DESCRIPTION					
-	-	S-1	1'-3"	24"	17"	34-6-6-7	6"	ASPHALT
-	-	-	-	-	-	-	-	Wet, medium dense, brown, FINE SAND and INORGANIC SILT.
5'0"	-	S-2	4'-6"	24"	12"	8-9-9-13	6"	Wet, medium dense, gray, Clayey SILT, and fine sand.
-	-	-	-	-	-	-	-	Bottom of Exploration = 6'
10'0"	-	-	-	-	-	-	-	-
15'0"	-	-	-	-	-	-	-	-
20'0"	-	-	-	-	-	-	-	-
25'0"	-	-	-	-	-	-	-	-
30'0"	-	-	-	-	-	-	-	-

Drillers: Peter Labossiere Helper: Jack Lefebvre Inspector:  
 Remarks:  
 S/#: Sample PEN: Penetration REC: Recovery S/C: Strata Change

(603) 437-1610 New Hampshire Boring, Inc. P.O. Box 165 Derry, NH 03038 E-Mail: nhb@nhboring.com Fax: (603) 437-0034

Boring # B-10 Project: Concord Avenue Roadway and Water Main Improvement - Camp Dresser & McKee, Inc. Project # 8501  
 Project Address: Concord Avenue City: Cambridge State: MA Zip:  
 Date Start: 04-02-09 Date End: 04-02-09 Location: See Plan

Casing: HW Sampler: S/S Casing: 4" Size: Sampler: 1-3/8 in. I.D. Type: Hammer Fall: 140 lbs. Size: 30 in.

GROUNDWATER OBSERVATION								
Date:	Depth:	Casing:				Stabilization Period		
04-02-09	None Encountered	DP	S/#	DEPTH	PEN	REC	BLOWS/6"	
		S/C	SAMPLE DESCRIPTION					
-	-	S-1	1'-3"	24"	16"	34-87-81-45	2-5"	ASPHALT
-	-	-	-	-	-	-	-	3" WEATHERED ASPHALT 7.5" CONCRETE
5'0"	-	S-2	4'-6"	24"	12"	29-21-28-27	4"	Moist, very dense, dark brown/gray, FINE SAND, some coarse sand, some gravel.
-	-	-	-	-	-	-	-	Wet, very dense, brown, FINE SAND and INORGANIC SILT, trace gravel.
10'0"	-	S-3	8'-10"	24"	2"	10-12-18-20	10"	Wet, very hard, CLAY, some gravel, trace fine to coarse sand.
-	-	-	-	-	-	-	-	Bottom of Exploration = 10'
15'0"	-	-	-	-	-	-	-	-
20'0"	-	-	-	-	-	-	-	-
25'0"	-	-	-	-	-	-	-	-
30'0"	-	-	-	-	-	-	-	-

Drillers: Gregg Leavitt Helper: Gary Waitt Inspector:  
 Remarks:  
 S/#: Sample PEN: Penetration REC: Recovery S/C: Strata Change

REV.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. GALLANT  
 DRAWN BY: J. CABRERA  
 SHEET CHK'D BY: J. DIERCKS  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

**CDM**  
 56 Exchange Terrace  
 Providence, RI 02903  
 Tel: (401) 751-5360  
 consulting • engineering • construction • operations

CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

**CONCORD AVENUE**  
**WATER MAIN AND ROADWAY RECONSTRUCTION**

**BORING LOGS II**

PROJECT NO. 0139-68660  
 FILE NAME: CSTBLO01.DWG  
 SHEET NO. 6  
 Accession No: 0139-P-xxxx

(603) 437-1610 New Hampshire Boring, Inc. Fax: (603) 437-0034

P.O. Box 165  
Derry, NH 03038  
E-Mail: [nhb@nhboring.com](mailto:nhb@nhboring.com)

**Boring # B-11** Project: Concord Avenue Roadway and Water Main Improvement - Camp Dresser & McKee, Inc. Project # 85901  
 Project Address: Concord Avenue City: Cambridge State: MA Zip:   
 Date Start: 04-06-09 Date End: 04-09-09 Location: See Plan

Casing: HW Sampler: Casing: 4" Size: Sampler: Type: S/S Fall: 1-3/8 in. I.D. Hammer: 140 lbs. 30 in.

GROUNDWATER OBSERVATION								
Date:	Depth:		Casing:			Stabilization Period		
04-06-09	4' 1"							
DP	S/#	DEPTH	PEN	REC	BLOWS/6"	S/C	SAMPLE DESCRIPTION	
-	S-1	1'-3"	24	14	27-84-7	2.7	ASPHALT	
-	-	-	-	-	-	1.1	3" WEATHERED ASPHALT 7.5" CONCRETE	
-	-	-	-	-	-	4	Moist, medium dense, FINE SAND and INORGANIC SILT, some coarse sand, trace gravel.	
5'0"	S-2	4'-6"	24	16	5-4-3-3	4	S-2: Moist, medium stiff, gray, CLAY, trace coarse sand.	
-	-	-	-	-	-	10	Moist, very stiff, gray-olive, mottled CLAY.	
-	S-3	8'-10"	24	12	14-21-28-32	10	Bottom of Exploration = 10'	
10'0"	-	-	-	-	-	-	Bottom of Exploration = 10'	
-	-	-	-	-	-	-	Bottom of Exploration = 10'	
-	-	-	-	-	-	-	Bottom of Exploration = 10'	
15'0"	-	-	-	-	-	-	Bottom of Exploration = 10'	
-	-	-	-	-	-	-	Bottom of Exploration = 10'	
-	-	-	-	-	-	-	Bottom of Exploration = 10'	
20'0"	-	-	-	-	-	-	Bottom of Exploration = 10'	
-	-	-	-	-	-	-	Bottom of Exploration = 10'	
-	-	-	-	-	-	-	Bottom of Exploration = 10'	
25'0"	-	-	-	-	-	-	Bottom of Exploration = 10'	
-	-	-	-	-	-	-	Bottom of Exploration = 10'	
-	-	-	-	-	-	-	Bottom of Exploration = 10'	
30'0"	-	-	-	-	-	-	Bottom of Exploration = 10'	

Drillers: Gregg Leavitt Helper: Gary Waitt Inspector:   
 Remarks:   
 S/#: Sample PEN: Penetration REC: Recovery S/C: Strata Change

(603) 437-1610 New Hampshire Boring, Inc. Fax: (603) 437-0034

P.O. Box 165  
Derry, NH 03038  
E-Mail: [nhb@nhboring.com](mailto:nhb@nhboring.com)

**Boring # B-12** Project: Concord Avenue Roadway and Water Main Improvement - Camp Dresser & McKee, Inc. Project # 85901  
 Project Address: Concord Avenue City: Cambridge State: MA Zip:   
 Date Start: 04-02-09 Date End: 04-02-09 Location: See Plan

Casing: HW Sampler: Casing: 4" Size: Sampler: Type: S/S Fall: 1-3/8 in. I.D. Hammer: 140 lbs. 30 in.

GROUNDWATER OBSERVATION								
Date:	Depth:		Casing:			Stabilization Period		
04-02-09	3' 7"							
DP	S/#	DEPTH	PEN	REC	BLOWS/6"	S/C	SAMPLE DESCRIPTION	
-	S-1	1'-3"	24	4	9-10-11-13	3	ASPHALT	
-	-	-	-	-	-	5.5	CONCRETE w/REBAR	
-	-	-	-	-	-	11-11-13-11	Moist, medium dense, gray, FINE SAND and INORGANIC SILT, some clay trace coarse sand.	
5'0"	S-2	4'-6"	24	12	11-11-13-11	8	Wet, medium dense, brown, FINE SAND and INORGANIC SILT, some coarse sand.	
-	-	-	-	-	-	10	Wet, very stiff, gray, CLAY, some inorganic silt, trace fine to coarse sand.	
-	S-3	8'-10"	24	12	12-13-10-12	10	Bottom of Exploration = 10'	
10'0"	-	-	-	-	-	-	Bottom of Exploration = 10'	
-	-	-	-	-	-	-	Bottom of Exploration = 10'	
-	-	-	-	-	-	-	Bottom of Exploration = 10'	
15'0"	-	-	-	-	-	-	Bottom of Exploration = 10'	
-	-	-	-	-	-	-	Bottom of Exploration = 10'	
-	-	-	-	-	-	-	Bottom of Exploration = 10'	
20'0"	-	-	-	-	-	-	Bottom of Exploration = 10'	
-	-	-	-	-	-	-	Bottom of Exploration = 10'	
-	-	-	-	-	-	-	Bottom of Exploration = 10'	
25'0"	-	-	-	-	-	-	Bottom of Exploration = 10'	
-	-	-	-	-	-	-	Bottom of Exploration = 10'	
-	-	-	-	-	-	-	Bottom of Exploration = 10'	
30'0"	-	-	-	-	-	-	Bottom of Exploration = 10'	

Drillers: Gregg Leavitt Helper: Gary Waitt Inspector:   
 Remarks:   
 S/#: Sample PEN: Penetration REC: Recovery S/C: Strata Change

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Derry, NH 03038  
E-Mail: [nhb@nhboring.com](mailto:nhb@nhboring.com)

**Boring # B-13** Project: Concord Avenue Roadway and Water Main Improvement - Camp Dresser & McKee, Inc. Project # 85901  
 Project Address: Concord Avenue City: Cambridge State: MA Zip:   
 Date Start: 04-02-09 Date End: 04-02-09 Location: See Plan

Casing: HW Sampler: Casing: 4" Size: Sampler: Type: S/S Fall: 1-3/8 in. I.D. Hammer: 140 lbs. 30 in.

GROUNDWATER OBSERVATION								
Date:	Depth:		Casing:			Stabilization Period		
04-02-09	3' 3"							
DP	S/#	DEPTH	PEN	REC	BLOWS/6"	S/C	SAMPLE DESCRIPTION	
-	S-1	1'-3"	24	16	57-42-18-23	19	ASPHALT	
-	-	-	-	-	-	4	Moist, very dense, gray, FINE TO COARSE SAND, some inorganic silt, some gravel.	
-	S-2	4'-6"	24	14	10-10-6-4	6	Wet, medium dense, gray, FINE SAND and INORGANIC SILT, some coarse sand, trace clay.	
5'0"	-	-	-	-	-	10	Wet, medium dense, gray, FINE SAND and INORGANIC SILT, trace coarse sand, trace organics.	
-	S-3	8'-10"	24	14	8-10-10-10	10	Bottom of Exploration = 10'	
10'0"	-	-	-	-	-	-	Bottom of Exploration = 10'	
-	-	-	-	-	-	-	Bottom of Exploration = 10'	
-	-	-	-	-	-	-	Bottom of Exploration = 10'	
15'0"	-	-	-	-	-	-	Bottom of Exploration = 10'	
-	-	-	-	-	-	-	Bottom of Exploration = 10'	
-	-	-	-	-	-	-	Bottom of Exploration = 10'	
20'0"	-	-	-	-	-	-	Bottom of Exploration = 10'	
-	-	-	-	-	-	-	Bottom of Exploration = 10'	
-	-	-	-	-	-	-	Bottom of Exploration = 10'	
25'0"	-	-	-	-	-	-	Bottom of Exploration = 10'	
-	-	-	-	-	-	-	Bottom of Exploration = 10'	
-	-	-	-	-	-	-	Bottom of Exploration = 10'	
30'0"	-	-	-	-	-	-	Bottom of Exploration = 10'	

Drillers: Gregg Leavitt Helper: Gary Waitt Inspector:   
 Remarks:   
 S/#: Sample PEN: Penetration REC: Recovery S/C: Strata Change

(603) 437-1610 New Hampshire Boring, Inc. Fax: (603) 437-0034

P.O. Box 165  
Derry, NH 03038  
E-Mail: [nhb@nhboring.com](mailto:nhb@nhboring.com)

**Boring # B-13A** Project: Water Main and Rotary Reconstruction Cambridge, Ma. - Camp Dresser & McKee, Inc. Project # 90-61  
 Project Address: Concord Avenue City: Cambridge State: MA Zip:   
 Date Start: 11-23-09 Date End: 11-23-09 Location: See Plan

Casing: HSA Sampler: Casing: 4-1/4" ID Sampler: Type: S/S Fall: 1-3/8 in. I.D. Hammer: 140 lbs. 30 in.

GROUNDWATER OBSERVATION								
Date:	Depth:		Casing:			Stabilization Period		
11-23-09	4' 1"							
DP	S/#	DEPTH	PEN	REC	BLOWS/6"	S/C	SAMPLE DESCRIPTION	
-	S-1	1'-3"	24	14	15-13-15-11	5	ASPHALT	
-	-	-	-	-	-	6	Moist, medium dense, brown, coarse to medium SAND, little fine gravel, trace silt.	
-	S-2	4'-6"	24	20	6-5-5-4	6	Moist, medium dense, gray, fine SAND, some silt.	
5'0"	-	-	-	-	-	8	Bottom of Exploration = 6'	
-	-	-	-	-	-	-	Bottom of Exploration = 6'	
-	-	-	-	-	-	-	Bottom of Exploration = 6'	
10'0"	-	-	-	-	-	-	Bottom of Exploration = 6'	
-	-	-	-	-	-	-	Bottom of Exploration = 6'	
-	-	-	-	-	-	-	Bottom of Exploration = 6'	
15'0"	-	-	-	-	-	-	Bottom of Exploration = 6'	
-	-	-	-	-	-	-	Bottom of Exploration = 6'	
-	-	-	-	-	-	-	Bottom of Exploration = 6'	
20'0"	-	-	-	-	-	-	Bottom of Exploration = 6'	
-	-	-	-	-	-	-	Bottom of Exploration = 6'	
-	-	-	-	-	-	-	Bottom of Exploration = 6'	
25'0"	-	-	-	-	-	-	Bottom of Exploration = 6'	
-	-	-	-	-	-	-	Bottom of Exploration = 6'	
-	-	-	-	-	-	-	Bottom of Exploration = 6'	
30'0"	-	-	-	-	-	-	Bottom of Exploration = 6'	

Drillers: Peter Labossiere Helper: Jack Lefebvre Inspector:   
 Remarks:   
 S/#: Sample PEN: Penetration REC: Recovery S/C: Strata Change

DESIGNED BY: M. GALLANT  
 DRAWN BY: J. CABRERA  
 SHEET CHK'D BY: J. DIERCKX  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010



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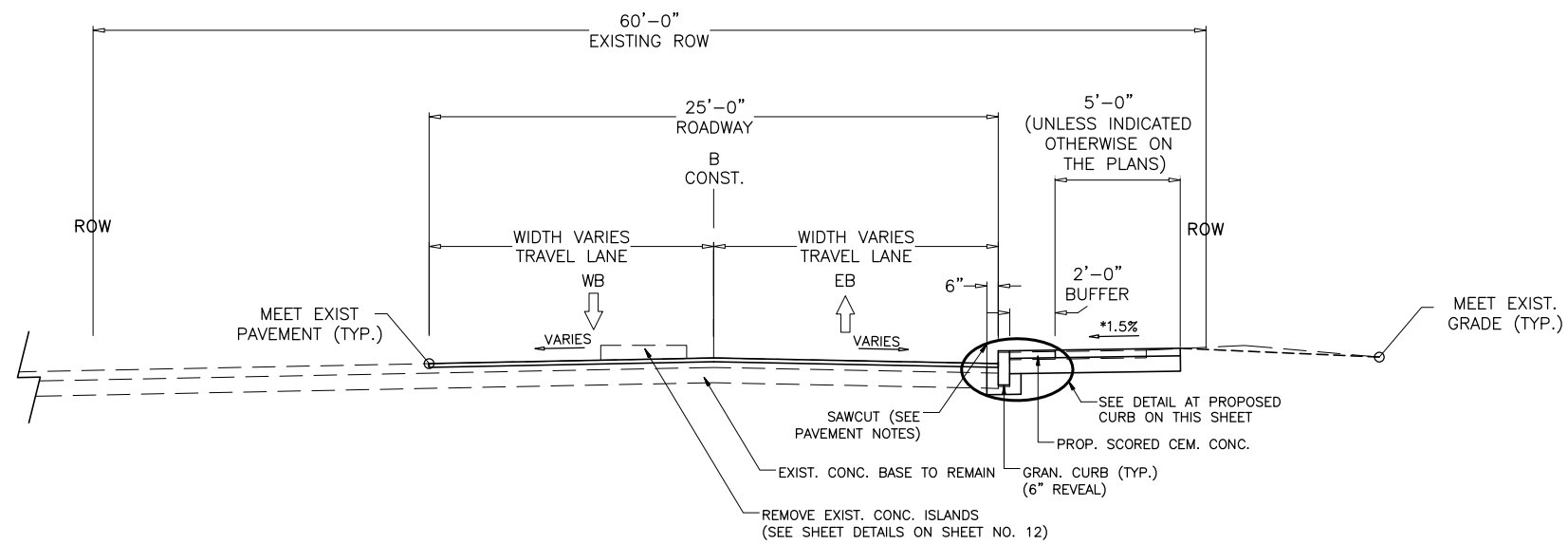
CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

## CONCORD AVENUE WATER MAIN AND ROADWAY RECONSTRUCTION

## BORING LOGS III

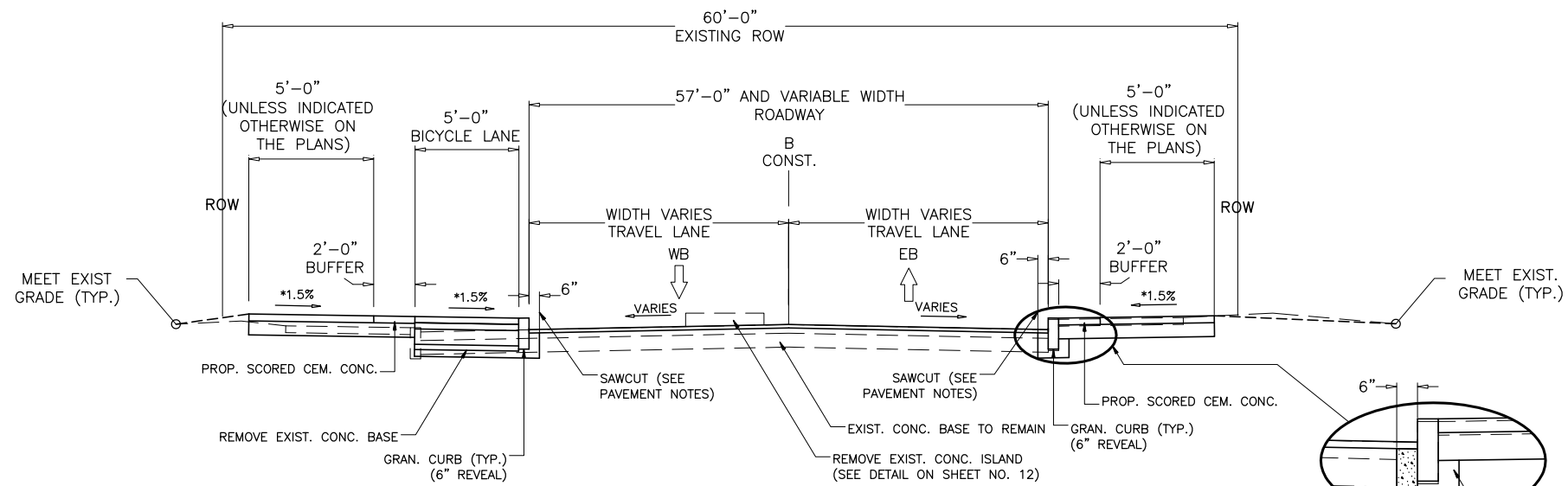
PROJECT NO. 0139-68660  
 FILE NAME: CSTBL001.DWG  
 SHEET NO. 6A  
 Accession No: 0139-P-xxxx

REV. NO.	DATE	DRWN	CHKD	REMARKS



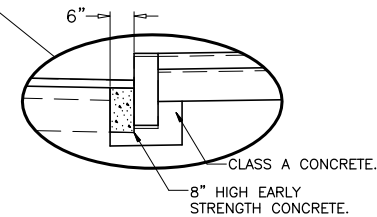
**TYPICAL SECTION - CONCORD AVENUE**  
**(STA. 102+84 TO STA. 104+55)**

SCALE: 1" = 4'  
 \* = TOLERANCE FOR CONSTRUCTION +/- 0.5% (TYP.)



**TYPICAL SECTION - CONCORD AVENUE**  
**(STA. 104+55 TO STA. 106+00)**

SCALE: 1" = 4'  
 \* = TOLERANCE FOR CONSTRUCTION +/- 0.5% (TYP.)



**DETAIL AT PROPOSED CURB**

SCALE: 1" = 2'  
 \* = TOLERANCE FOR CONSTRUCTION +/- 0.5% (TYP.)

**PAVEMENT NOTES:**

**2" COLDPLANE AND OVERLAY:**

SURFACE COURSE:

2" (MAX) HMA SURFACE COURSE - TOP COURSE

LEVELING COURSE:

WHERE REQUIRED, PLACE VARIABLE DEPTH HOT MIX ASPHALT TOP COURSE MATERIAL.

COLD PLANE:

COLD PLANE 2" OF EXISTING ASPHALT.

TACK COAT:

EMULSIFIED ASPHALT TACK COAT GRADE RS-1 PLACED AT A RESIDUAL RATE OF 0.07 GALLONS PER SQUARE YARD, OVER COLD PLANED SURFACES.

SAWCUT:

SAWCUT EXISTING PAVEMENT FULL DEPTH 6" FROM THE PROPOSED CURB.

**4" COLDPLANE AND OVERLAY:**

SURFACE COURSE:

2" (MAX) HMA SURFACE COURSE - TOP COURSE OVER  
 2" (MIN) HMA INTERMEDIATE COURSE - BINDER

LEVELING COURSE:

WHERE REQUIRED, PLACE VARIABLE DEPTH HOT MIX ASPHALT TOP COURSE MATERIAL (REFER TO CROSS SECTIONS).

COLD PLANE:

COLD PLANE 4" OF EXISTING ASPHALT.

TACK COAT:

EMULSIFIED ASPHALT TACK COAT GRADE RS-1 PLACED AT A RESIDUAL RATE OF 0.07 GALLONS PER SQUARE YARD, OVER EXISTING SURFACES.

SAWCUT:

SAWCUT EXISTING PAVEMENT FULL DEPTH 6" FROM THE PROPOSED CURB.

**ASPHALT BICYCLE LANE:**

SURFACE COURSE:

1.5" HMA SURFACE COURSE - TOP COURSE OVER  
 2" HMA INTERMEDIATE COURSE - BINDER

BASE:

8" GRAVEL BORROW (TYPE B)

**CEMENT CONCRETE SIDEWALKS AND WHEELCHAIR RAMPS:**

SURFACE COURSE:

4" CEM. CONC.

BASE:

8" GRAVEL BORROW (TYPE B) (AS NEEDED)

**CEMENT CONCRETE DRIVES AND DRIVEWAY APRONS:**

SURFACE:

6" CEM. CONC.

BASE:

8" GRAVEL BORROW (TYPE B) (AS NEEDED)

**HOT MIX ASPHALT DRIVE CONSTRUCTION:**

SURFACE:

3.5" HOT MIX ASPHALT PLACED IN TWO LAYERS:  
 1.5" TOP COURSE OVER 2" INTERMEDIATE COURSE

BASE:

8" GRAVEL BORROW (TYPE B) (AS NEEDED)

**TABLE OF PAVEMENT CROSS SLOPES - LEFT SIDE**

FROM STA.	TO STA.	CROSS SLOPE
BEGIN	104+00	-2.0%
104+00	106+00	-3.0%
106+00	115+50	-2.0%
115+50	121+50	-3.0%
121+50	122+00	-2.5%
122+00	135+00	-2.0%
135+00	137+50	-3.0%
137+50	END	-2.0%

**TABLE OF PAVEMENT CROSS SLOPES - RIGHT SIDE**

FROM STA.	TO STA.	CROSS SLOPE
BEGIN	104+50	MATCH EXIST.
104+50	119+50	-2.0%
119+50	120+50	-3.0%
120+50	END	-2.0%

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: C. LIGGETT  
 DRAWN BY: A. LYNCH  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

**CDM**  
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CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT  
**CONCORD AVENUE**  
**WATER MAIN AND ROADWAY RECONSTRUCTION**

**TYPICAL SECTIONS I**

PROJECT NO. 0139-68660  
 FILE NAME: CST1001  
 SHEET NO.  
**7**  
 Accession No: 0139-P-xxxx



**PAVEMENT NOTES:**

**2" COLDPLANE AND OVERLAY:**  
 SURFACE COURSE:  
 2" (MAX.) HMA SURFACE COURSE - TOP COURSE  
 LEVELING COURSE:  
 WHERE REQUIRED, PLACE VARIABLE DEPTH HOT MIX ASPHALT TOP COURSE MATERIAL.  
 COLD PLANE:  
 COLD PLANE 2" OF EXISTING ASPHALT.  
 TACK COAT:  
 EMULSIFIED ASPHALT TACK COAT GRADE RS-1 PLACED AT A RESIDUAL RATE OF 0.07 GALLONS PER SQUARE YARD, OVER COLD PLANED SURFACES.  
 SAWCUT:  
 SAWCUT EXISTING PAVEMENT FULL DEPTH 6" FROM THE PROPOSED CURB.

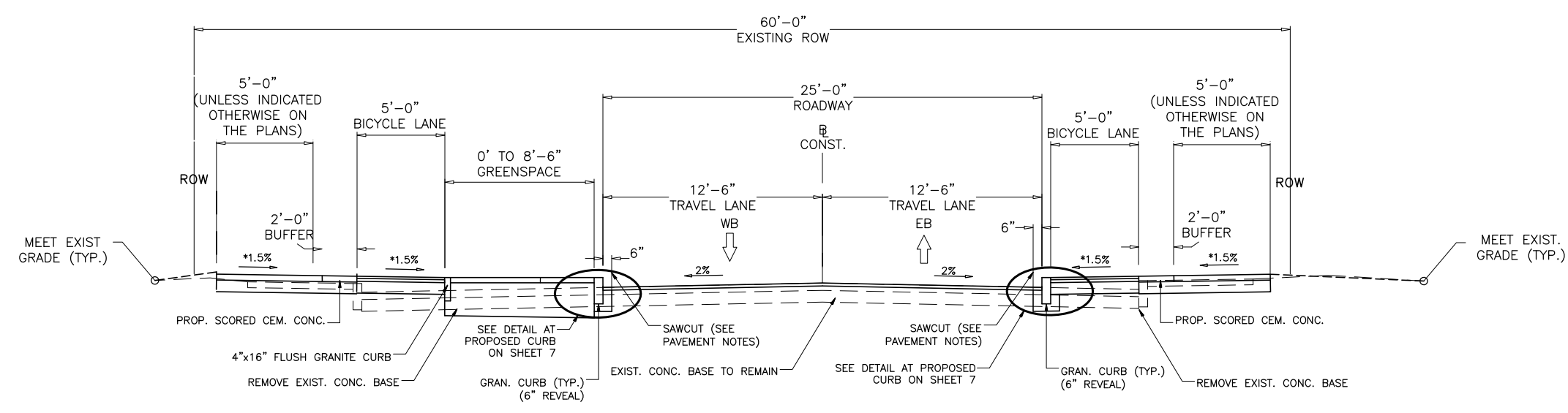
**4" COLDPLANE AND OVERLAY:**  
 SURFACE COURSE:  
 2" (MAX.) HMA SURFACE COURSE - TOP COURSE OVER  
 2" (MIN.) HMA INTERMEDIATE COURSE - BINDER  
 LEVELING COURSE:  
 WHERE REQUIRED, PLACE VARIABLE DEPTH HOT MIX ASPHALT TOP COURSE MATERIAL (REFER TO CROSS SECTIONS).  
 COLD PLANE:  
 COLD PLANE 4" OF EXISTING ASPHALT.  
 TACK COAT:  
 EMULSIFIED ASPHALT TACK COAT GRADE RS-1 PLACED AT A RESIDUAL RATE OF 0.07 GALLONS PER SQUARE YARD, OVER EXISTING SURFACES.  
 SAWCUT:  
 SAWCUT EXISTING PAVEMENT FULL DEPTH 6" FROM THE PROPOSED CURB.

**ASPHALT BICYCLE LANE:**  
 SURFACE COURSE:  
 1.5" HMA SURFACE COURSE - TOP COURSE OVER  
 2" HMA INTERMEDIATE COURSE - BINDER  
 BASE:  
 8" GRAVEL BORROW (TYPE B)

**CEMENT CONCRETE SIDEWALKS AND WHEELCHAIR RAMPS:**  
 SURFACE COURSE:  
 4" CEM. CONC.  
 BASE:  
 8" GRAVEL BORROW (TYPE B) (AS NEEDED)

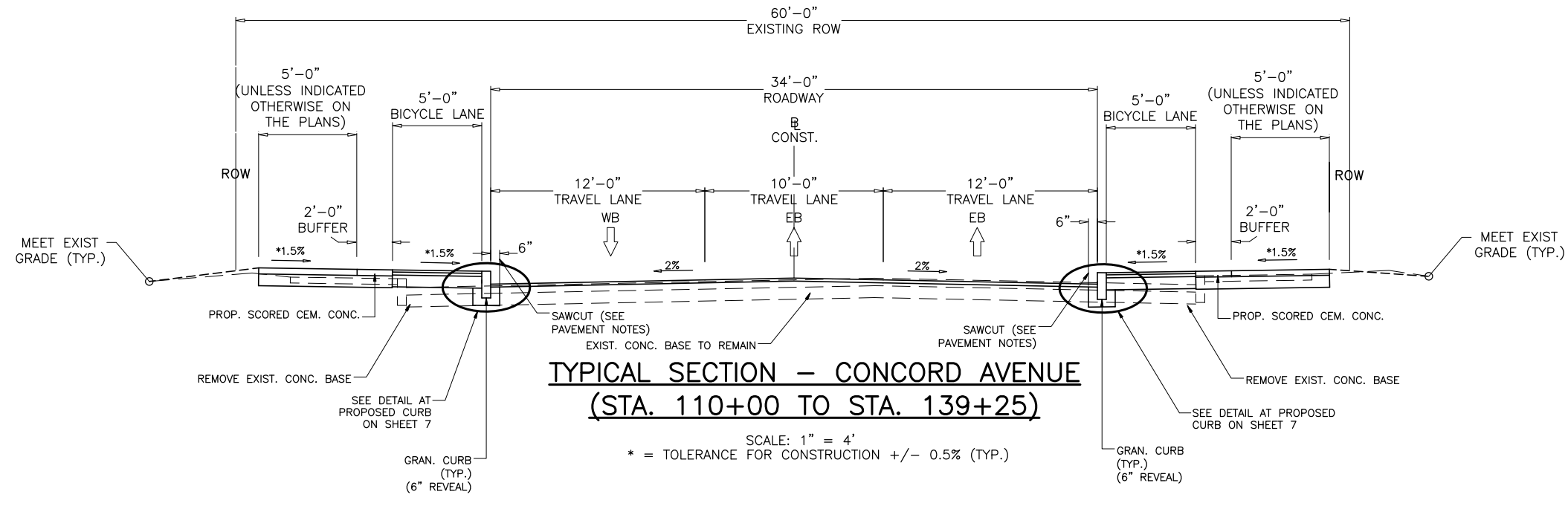
**CEMENT CONCRETE DRIVES AND DRIVEWAY APRONS:**  
 SURFACE:  
 6" CEM. CONC.  
 BASE:  
 8" GRAVEL BORROW (TYPE B) (AS NEEDED)

**HOT MIX ASPHALT DRIVE CONSTRUCTION:**  
 SURFACE:  
 3.5" HOT MIX ASPHALT PLACED IN TWO LAYERS:  
 1.5" TOP COURSE OVER 2" INTERMEDIATE COURSE  
 BASE:  
 8" GRAVEL BORROW (TYPE B) (AS NEEDED)



**TYPICAL SECTION - CONCORD AVENUE  
 (STA. 106+00 TO STA. 110+00)**

SCALE: 1" = 4'  
 \* = TOLERANCE FOR CONSTRUCTION +/- 0.5% (TYP.)



**TYPICAL SECTION - CONCORD AVENUE  
 (STA. 110+00 TO STA. 139+25)**

SCALE: 1" = 4'  
 \* = TOLERANCE FOR CONSTRUCTION +/- 0.5% (TYP.)

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: A. HEALEY  
 DRAWN BY: A. HEALEY  
 SHEET CHK'D BY: L. SHERMAN  
 CROSS CHK'D BY: K. JOHNSON  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

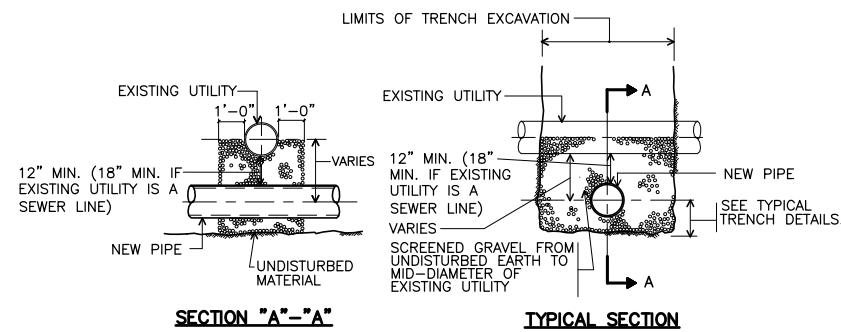
**CDM**  
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 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

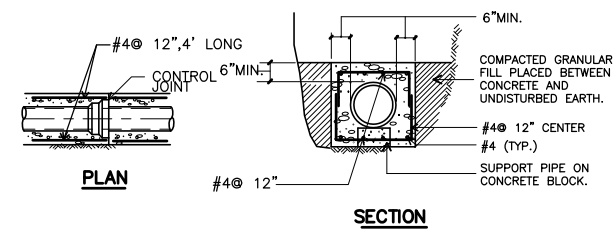
**TYPICAL SECTIONS II**

PROJECT NO. 0139-68660  
 FILE NAME: CSTST002  
 SHEET NO.  
**8**  
 Accession No: 0139-P-xxxx



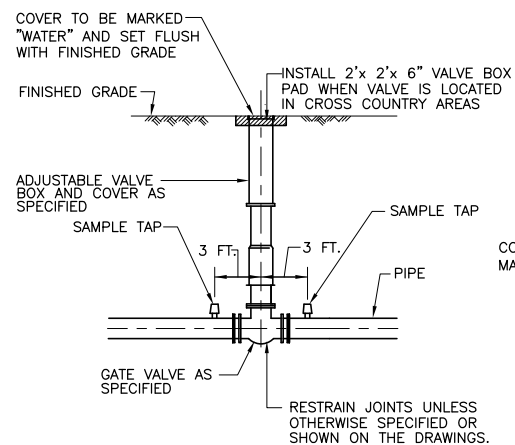
**SECTION "A"-A**  
**TYPICAL SECTION**  
**UTILITIES CROSSING DETAIL**  
NTS

- NOTE:
- TO THE EXTENT POSSIBLE NEW WATER MAINS SHALL CROSS OVER EXISTING SEWERS. WATER MAINS SHALL BE CONCRETE ENCASED IF THEY ARE INSTALLED UNDER AN EXISTING SEWER. TO THE EXTENT POSSIBLE, ONE FULL LENGTH OF NEW MECHANICAL JOINT WATER PIPE SHALL BE INSTALLED CENTERED UNDER THE SEWER CROSSING SO THAT THE WATER MAIN PIPE JOINTS WILL BE AS FAR AWAY FROM THE SEWER CROSSING AS POSSIBLE.

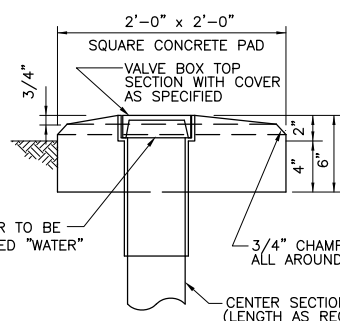


**CONCRETE ENCASEMENT**  
NTS

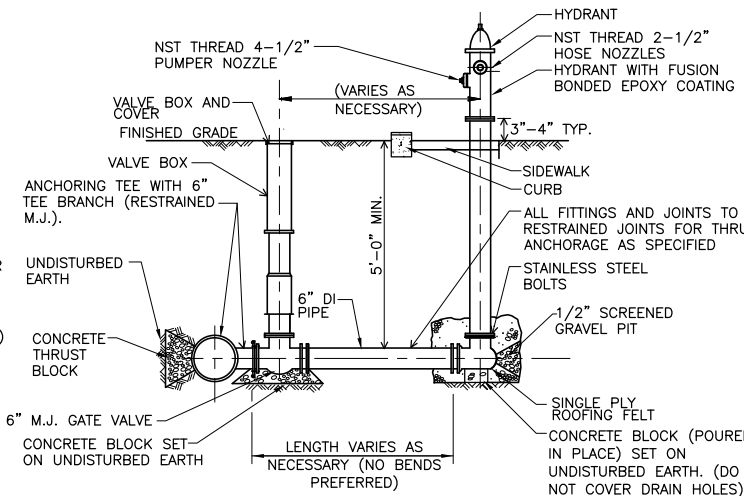
- NOTES:
- CONTROL JOINTS AND PIPE JOINTS FOR ENCASEMENT SHALL COINCIDE FOR SPACING. MAX. DISTANCE BETWEEN CONTROL JOINTS SHALL BE 24'.
  - REINFORCING STEEL TO BE USED ONLY WHEN DEPTH OF COVER TO TOP OF SURFACE OF CONCRETE IS LESS THAN 5'-0".



**TYPICAL GATE VALVE AND BOX DETAIL**  
NTS

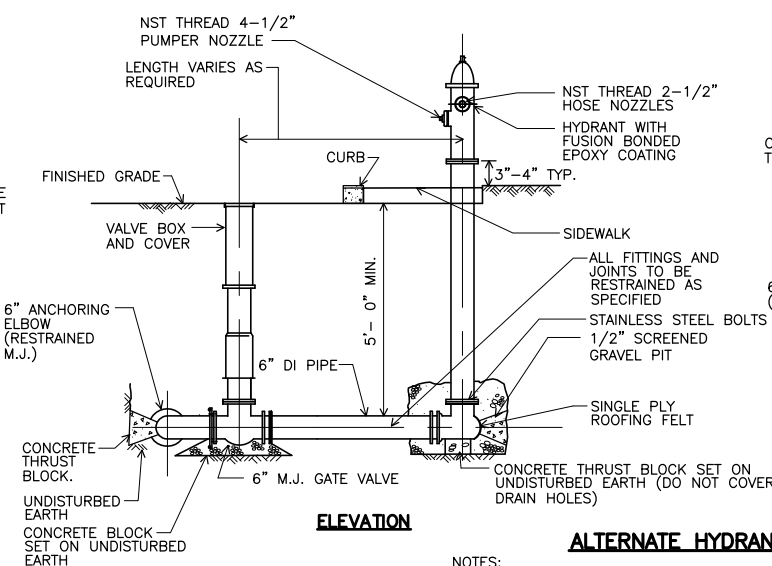


**VALVE BOX PAD**  
NTS



**STANDARD HYDRANT CONNECTION DETAIL**  
NTS

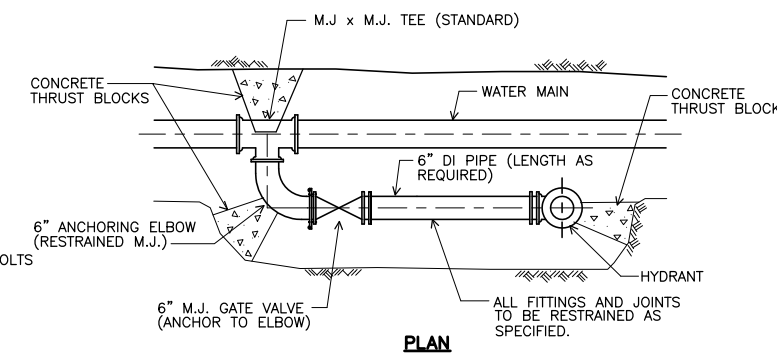
- NOTES:
- HYDRANTS SHALL BE INSTALLED TOWARDS THE BACK EDGE (PROPERTY SIDE) OF THE SIDEWALK. HYDRANTS SHOULD NOT BE INSTALLED WHERE THERE MAY BE SUBJECT TO DAMAGE FROM TRAFFIC, PLOWING, ETC.
  - HYDRANTS SHALL BE LOCATED TO ALLOW COMPLETE/FREE TURNING OF A STANDARD HYDRANT WRENCH.
  - SHOULD FIELD ADJUSTMENTS BE REQUIRED TO PROPOSED HYDRANT LOCATIONS SHOWN ON THE DRAWINGS, CONTRACTOR SHALL CONSULT WITH BOTH THE CAMBRIDGE WATER DEPARTMENT AND FIRE DEPARTMENT FOR REVIEW AND APPROVAL.



**ELEVATION**

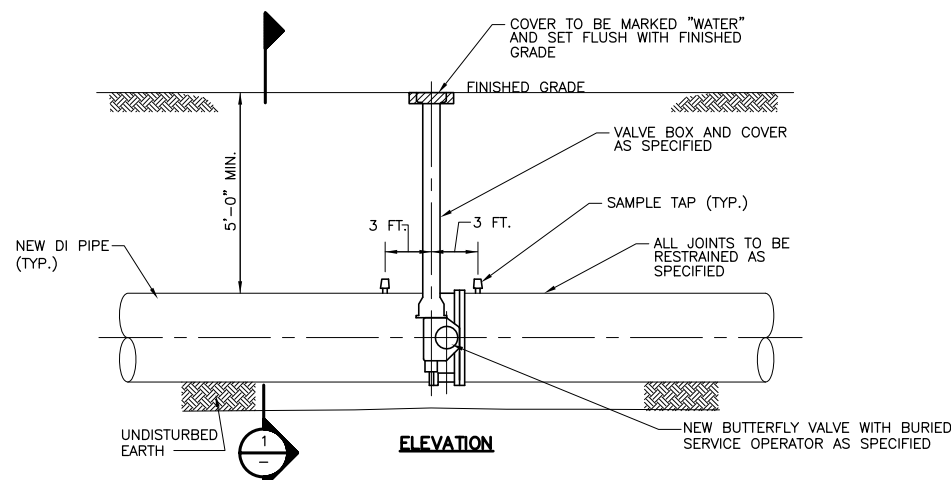
**ALTERNATE HYDRANT CONNECTION DETAIL**  
NTS

- NOTES:
- HYDRANTS SHALL BE INSTALLED TOWARDS THE BACK EDGE (PROPERTY SIDE) OF THE SIDEWALK. HYDRANTS SHOULD NOT BE INSTALLED WHERE THERE MAY BE SUBJECT TO DAMAGE FROM TRAFFIC, PLOWING, ETC.
  - HYDRANTS SHALL BE LOCATED TO ALLOW COMPLETE/FREE TURNING OF A STANDARD HYDRANT WRENCH.
  - SHOULD FIELD ADJUSTMENTS BE REQUIRED TO PROPOSED HYDRANT LOCATIONS SHOWN ON THE DRAWINGS, CONTRACTOR SHALL CONSULT WITH BOTH THE CAMBRIDGE WATER DEPARTMENT AND FIRE DEPARTMENT FOR REVIEW AND APPROVAL.

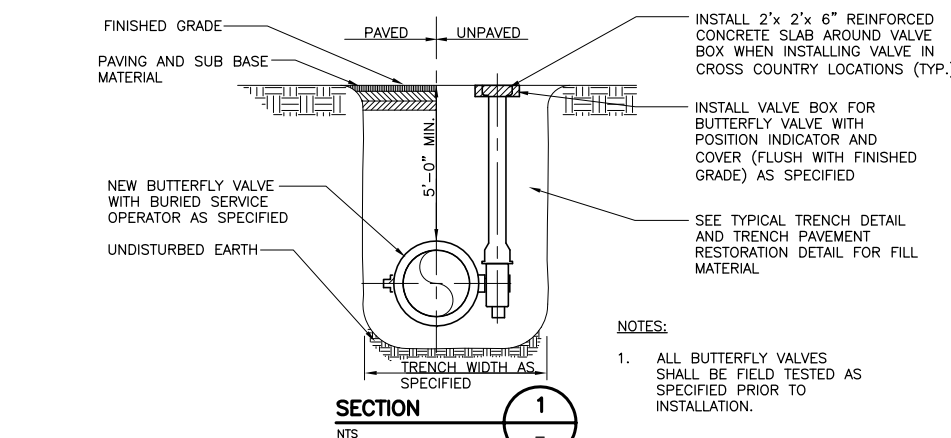


**PLAN**

**MANUAL AIR RELEASE DETAIL**  
NTS



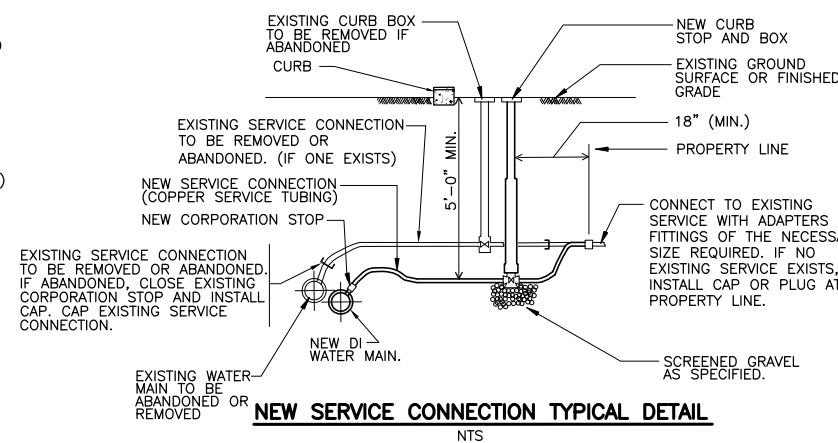
**ELEVATION**



**SECTION**

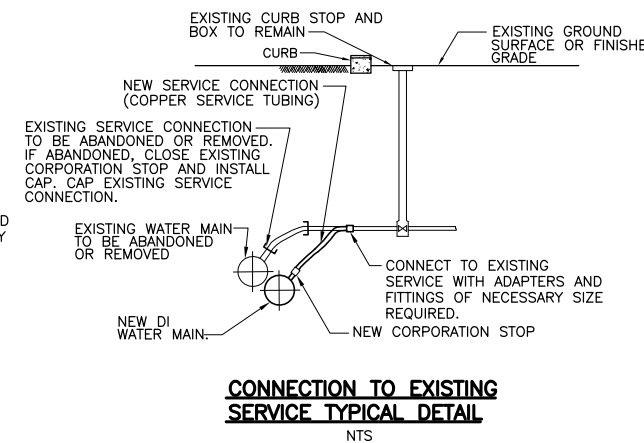
**TYPICAL BUTTERFLY VALVE AND BOX DETAIL**  
NTS

- NOTES:
- ALL BUTTERFLY VALVES SHALL BE FIELD TESTED AS SPECIFIED PRIOR TO INSTALLATION.



**NEW SERVICE CONNECTION TYPICAL DETAIL**  
NTS

- NOTES:
- FOR SERVICES GREATER THAN 1", A GATE BOX AND COVER SHALL BE INSTALLED OVER THE NEW CORPORATION STOP AT THE MAIN AND NO CURB STOP AND BOX IS REQUIRED.



**CONNECTION TO EXISTING SERVICE TYPICAL DETAIL**  
NTS

- NOTES:
- FOR SERVICES GREATER THAN 1", A GATE BOX AND COVER SHALL BE INSTALLED OVER THE NEW CORPORATION STOP AT THE MAIN AND NO CURB STOP AND BOX IS REQUIRED.

REV. NO.	DATE	DRWN	CHKD	REMARKS

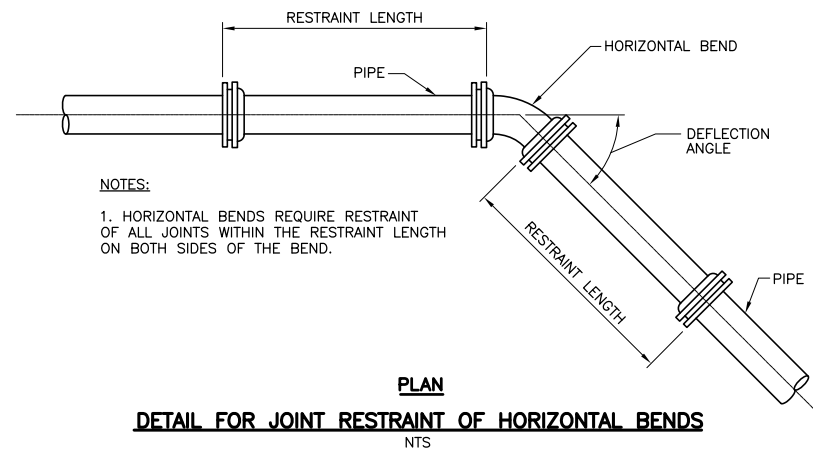
DESIGNED BY: M. GALLANT  
DRAWN BY: J. CABRERA  
SHEET CHK'D BY: J. DIERCKX  
CROSS CHK'D BY: L. SHERMAN  
APPROVED BY: L. SHERMAN  
DATE: JANUARY 2010

**CDM**  
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CITY OF CAMBRIDGE, MASSACHUSETTS  
DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT  
**CONCORD AVENUE**  
**WATER MAIN AND ROADWAY RECONSTRUCTION**

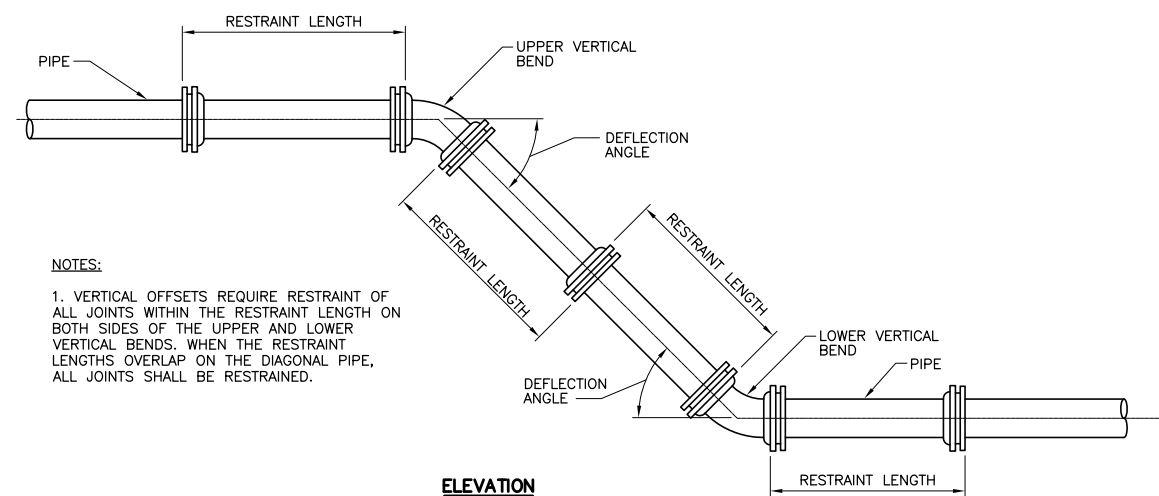
**WATER MAIN CONSTRUCTION DETAILS I**

PROJECT NO. 0139-68660  
FILE NAME: CSTD1002.DWG  
SHEET NO. 9  
Accession No: 01330-PP-100004



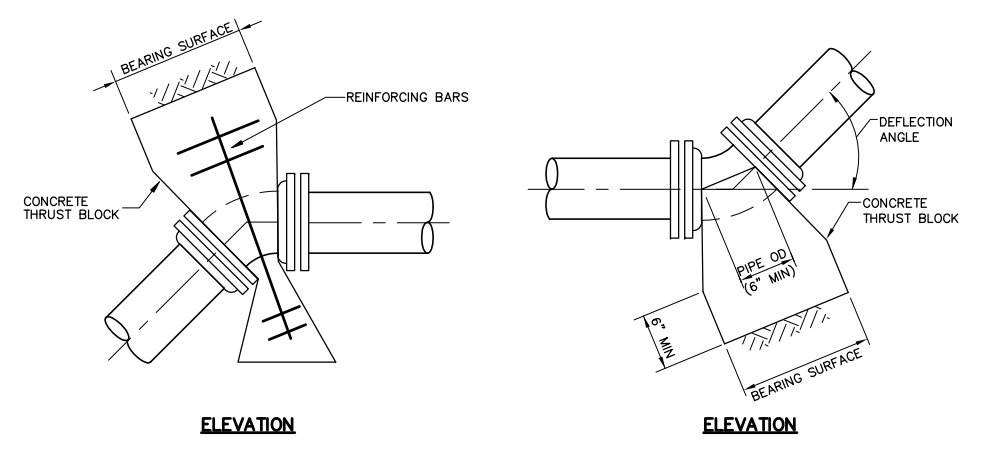
NOTES:  
1. HORIZONTAL BENDS REQUIRE RESTRAINT OF ALL JOINTS WITHIN THE RESTRAINT LENGTH ON BOTH SIDES OF THE BEND.

**PLAN**  
**DETAIL FOR JOINT RESTRAINT OF HORIZONTAL BENDS**  
NTS

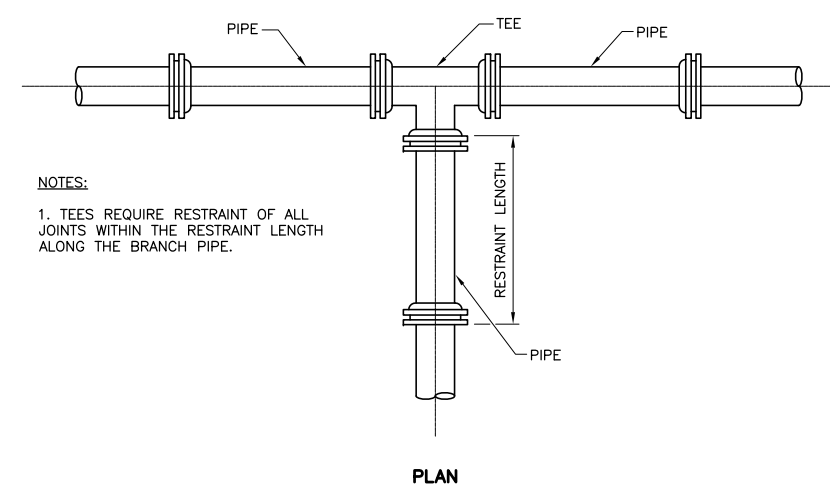


NOTES:  
1. VERTICAL OFFSETS REQUIRE RESTRAINT OF ALL JOINTS WITHIN THE RESTRAINT LENGTH ON BOTH SIDES OF THE UPPER AND LOWER VERTICAL BENDS. WHEN THE RESTRAINT LENGTHS OVERLAP ON THE DIAGONAL PIPE, ALL JOINTS SHALL BE RESTRAINED.

**ELEVATION**  
**DETAIL FOR JOINT RESTRAINT OF VERTICAL OFFSETS/BENDS**  
NTS

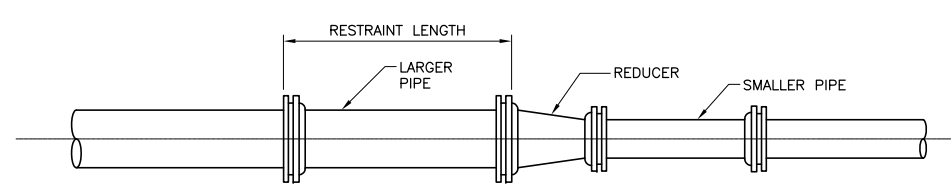


**ELEVATION**  
**DETAIL FOR VERTICAL BENDS**



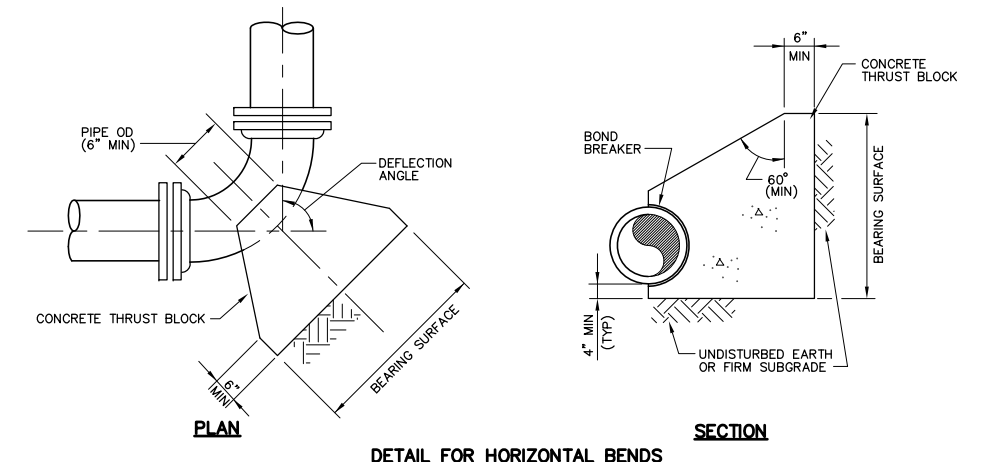
NOTES:  
1. TEES REQUIRE RESTRAINT OF ALL JOINTS WITHIN THE RESTRAINT LENGTH ALONG THE BRANCH PIPE.

**PLAN**  
**DETAIL FOR JOINT RESTRAINT OF TEES**  
NTS

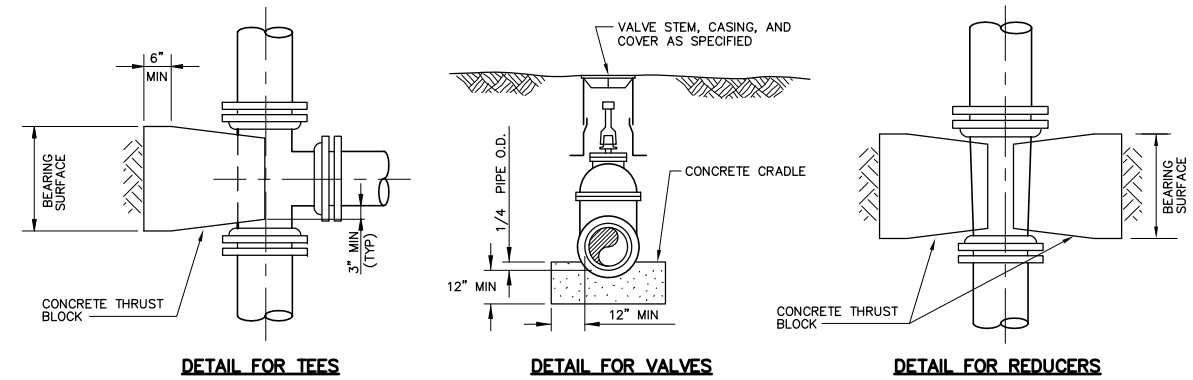


NOTES:  
1. REDUCERS REQUIRE RESTRAINT OF ALL JOINTS WITHIN THE RESTRAINT LENGTH EXTENDING FROM THE REDUCER ALONG THE SIDE OF THE LARGER PIPE.

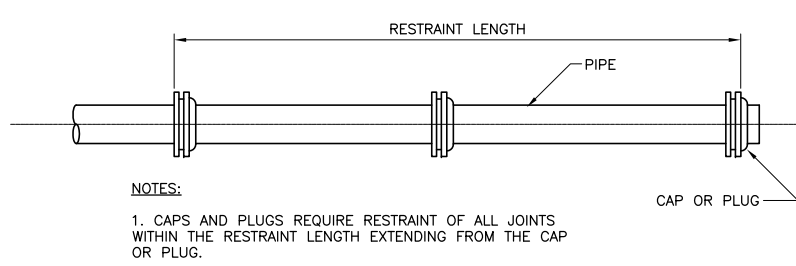
**PLAN**  
**DETAIL FOR JOINT RESTRAINT OF REDUCERS**  
NTS



**PLAN**  
**DETAIL FOR HORIZONTAL BENDS**

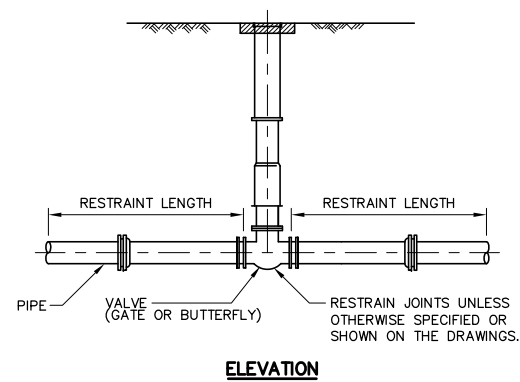


**DETAIL FOR TEES**      **DETAIL FOR VALVES**      **DETAIL FOR REDUCERS**



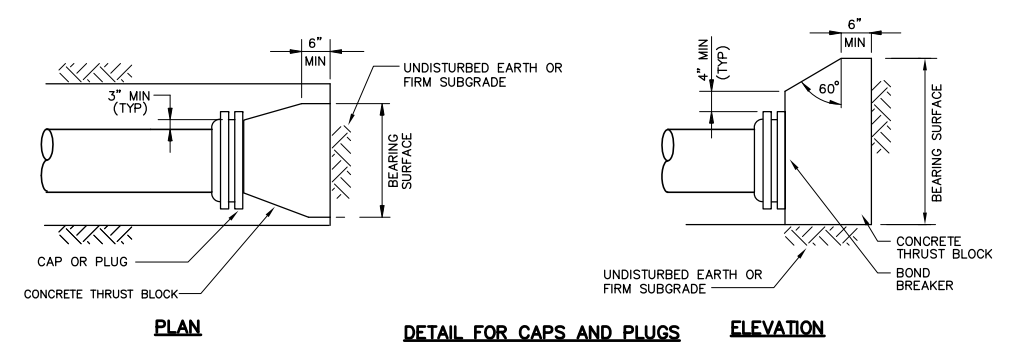
NOTES:  
1. CAPS AND PLUGS REQUIRE RESTRAINT OF ALL JOINTS WITHIN THE RESTRAINT LENGTH EXTENDING FROM THE CAP OR PLUG.

**PLAN**  
**DETAIL FOR JOINT RESTRAINT OF CAPS/PLUGS**  
NTS



NOTES:  
1. VALVES REQUIRE RESTRAINT OF ALL JOINTS WITHIN THE RESTRAINT LENGTH ON BOTH SIDES OF THE VALVE.

**ELEVATION**  
**DETAIL FOR JOINT RESTRAINT OF VALVES**  
NTS



**PLAN**  
**DETAIL FOR CAPS AND PLUGS**      **ELEVATION**  
**CONCRETE THRUST BLOCK DETAILS**  
NTS

NOTES:  
1. BEARING SURFACE, WHERE POSSIBLE, SHOULD BE PLACED AGAINST UNDISTURBED SOIL. WHERE THIS IS NOT POSSIBLE, THE FILL BETWEEN THE BEARING SURFACE AND UNDISTURBED SOIL MUST BE COMPACTED TO AT LEAST 90% STANDARD PROCTOR DENSITY.  
2. THRUST BLOCK HEIGHT SHOULD BE EQUAL TO OR LESS THAN ONE-HALF THE TOTAL DEPTH TO THE BOTTOM OF THE BLOCK, BUT NOT LESS THAN THE PIPE DIAMETER.  
3. THRUST BLOCK HEIGHT SHOULD BE SELECTED SUCH THAT THE BLOCK WIDTH VARIES BETWEEN ONE AND TWO TIMES THE BLOCK HEIGHT.

DESIGNED BY: M. GALLANT	CDM
DRAWN BY: J. CABRERA	56 Exchange Terrace Providence, RI 02903 Tel: (401) 751-5360
SHEET CHK'D BY: J. DIERCKX	consulting • engineering • construction • operations
CROSS CHK'D BY: L. SHERMAN	
APPROVED BY: L. SHERMAN	
DATE: JANUARY 2010	

CITY OF CAMBRIDGE, MASSACHUSETTS  
DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

**CONCORD AVENUE  
WATER MAIN AND ROADWAY RECONSTRUCTION**

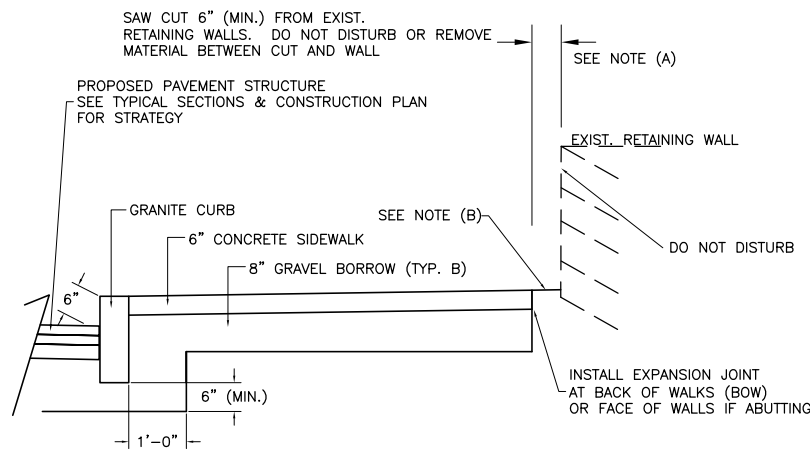
**WATER MAIN CONSTRUCTION DETAILS II**

PROJECT NO. 0139-68660  
FILE NAME: CSTD1002.DWG

SHEET NO.  
**10**

Accession No: 01330-PP-100004

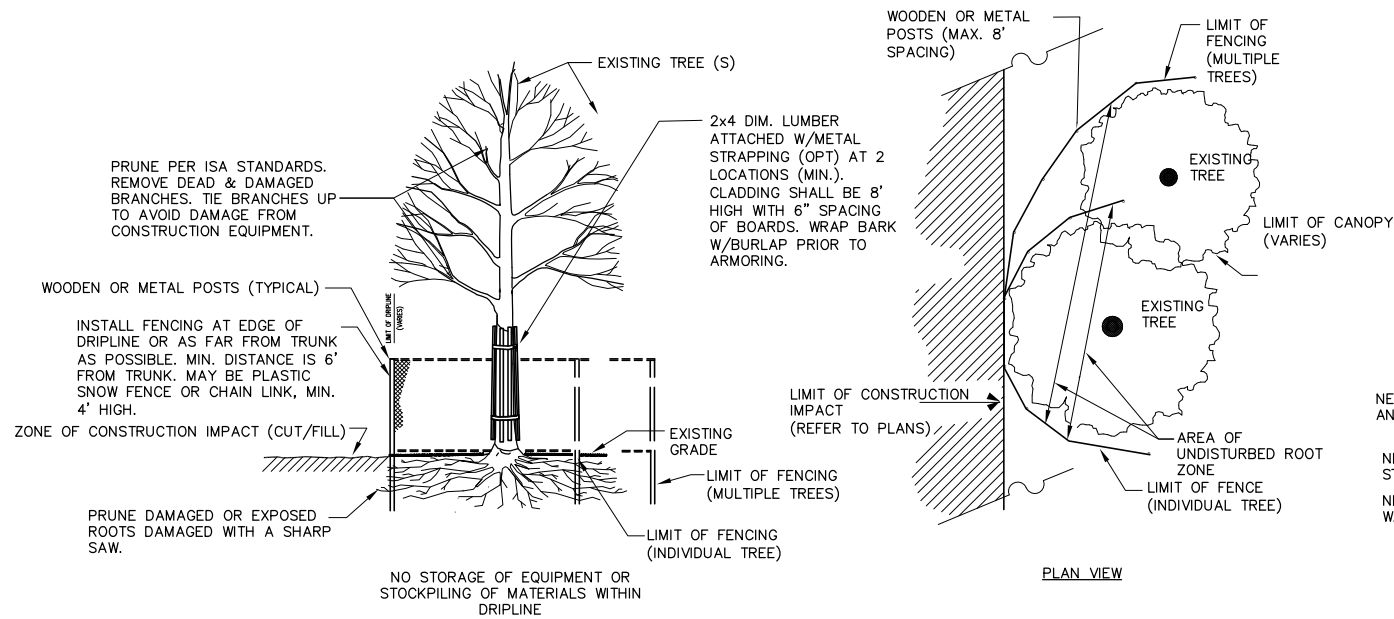
REV. NO.	DATE	DRWN	CHKD	REMARKS



**CEM. CONC. SIDEWALK AT EXISTING WALLS DETAIL**

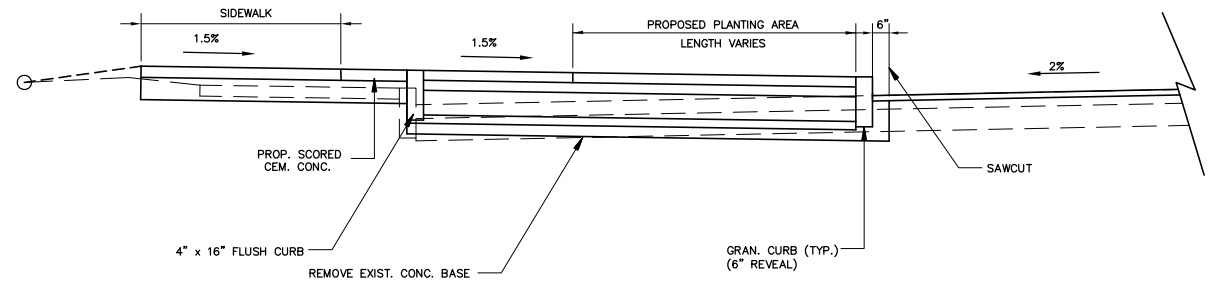
N.T.S.

- (A) CONTRACTOR SHALL MAINTAIN A MINIMUM OF 6" FROM ALL EXISTING WALLS
- (B) UNLESS OTHERWISE NOTED OR DIRECTED BY ENGINEER, BACK OF WALK FILL SHALL BE PORTLAND CEM. CONC. (TYPE A) TO EXISTING RETAINING WALLS/STRUCTURES. INSTALL EXPANSION JOINT AT BACK OF WALK. GRADE TO DRAIN TOWARD SIDEWALK. NO REMOVAL OF MATERIAL WITHIN 6" OF WALLS SHALL BE PERMITTED WITHOUT PRIOR APPROVAL FROM ENGINEER



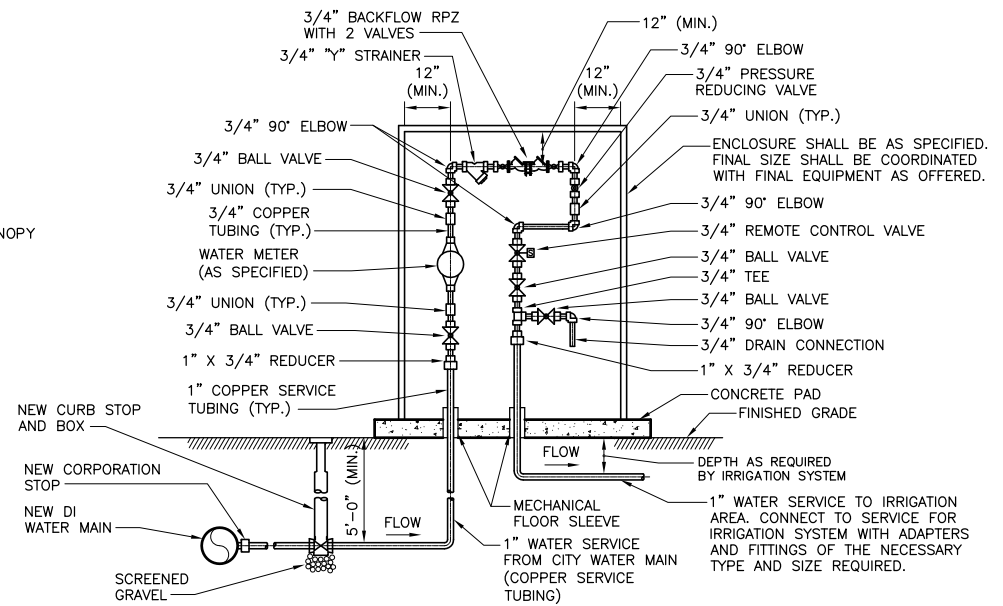
**TREE PROTECTION DETAIL**

NOT TO SCALE



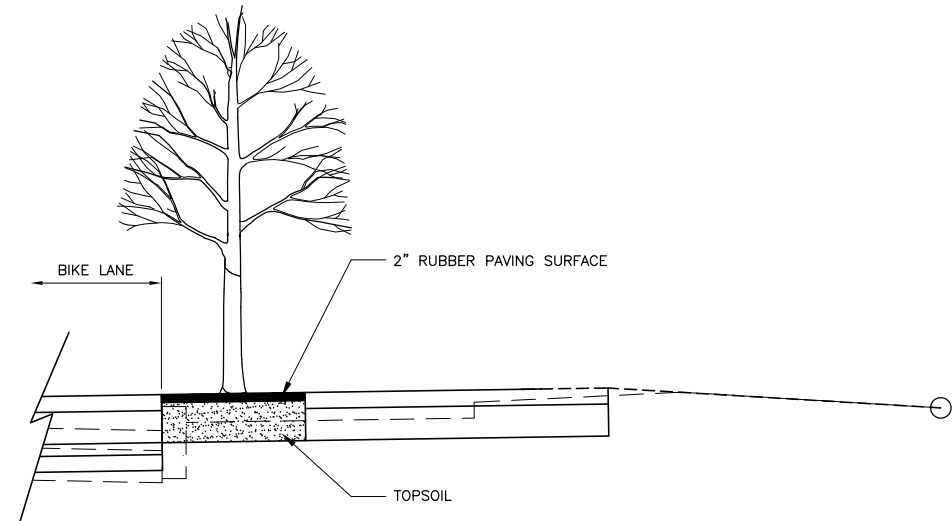
**EXISTING CONCRETE PAVEMENT REMOVAL AT GREENSPACE AREAS**

NOT TO SCALE



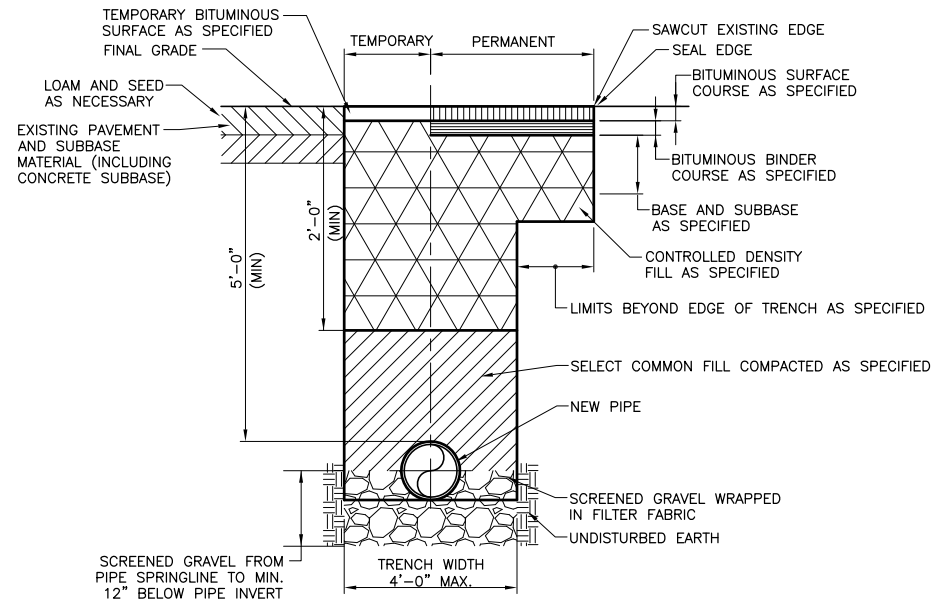
**IRRIGATION CONTROL BOX DETAIL**

NOT TO SCALE



**PROPOSED TREE WELL SECTION A-A**

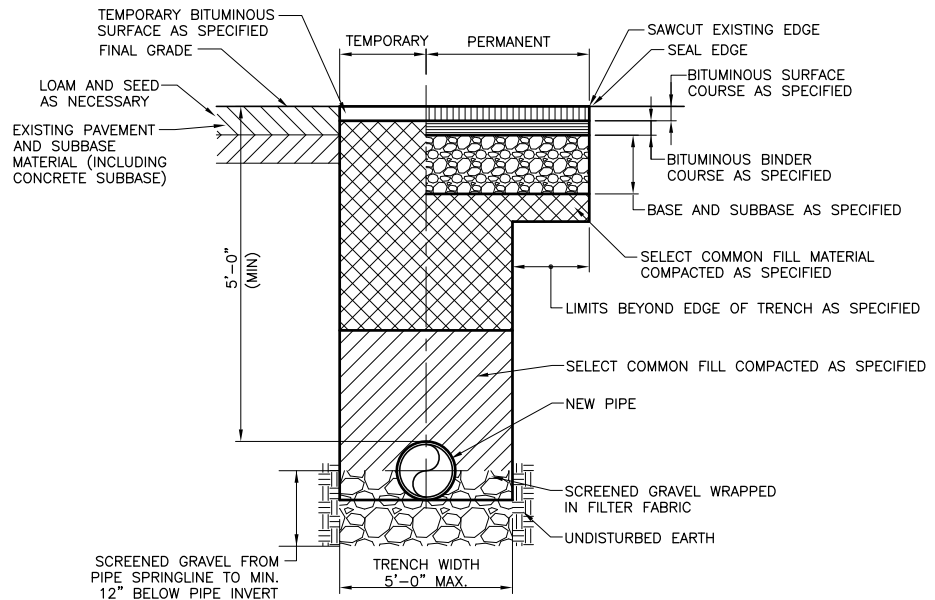
NOT TO SCALE



**TYPICAL TRENCH AND PAVEMENT RESTORATION DETAIL FOR LATERAL WATER MAIN AND SERVICE TRENCHES (12" DIAMETER AND SMALLER PIPES)**

NOTES: NTS

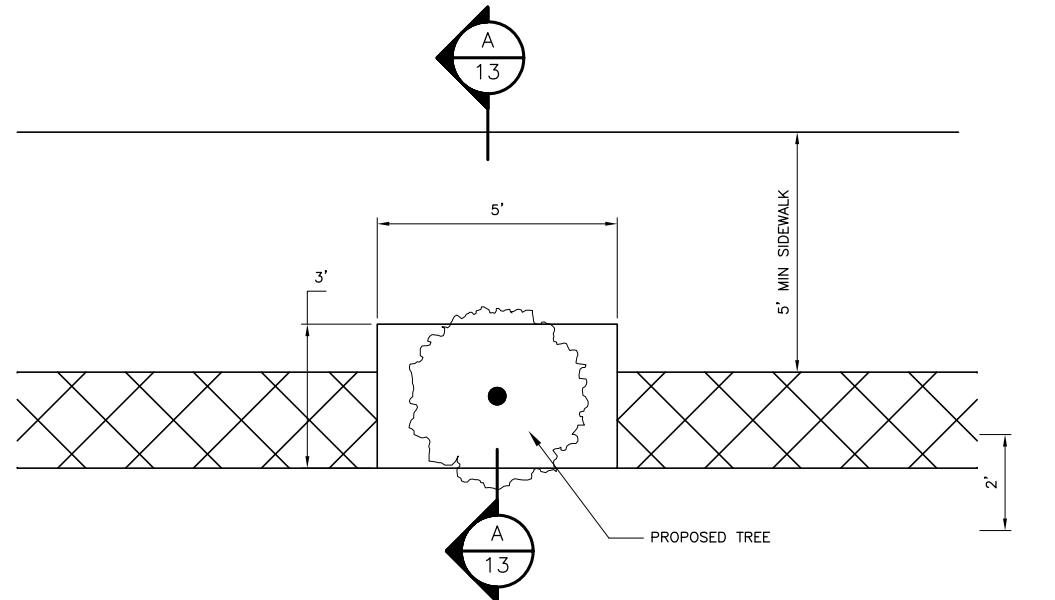
- 1. BACKFILL, COMPACTION AND PAVEMENT RESTORATION SHALL BE AS SPECIFIED.



**TYPICAL TRENCH AND PAVEMENT RESTORATION DETAIL FOR NEW 16" DI WATER PIPE ALONG CONCORD AVENUE**

NOTES: NTS

- 1. BACKFILL, COMPACTION AND PAVEMENT RESTORATION SHALL BE AS SPECIFIED.



**PROPOSED TREE WELL DETAIL**

NOT TO SCALE

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. GALLANT  
 DRAWN BY: J. CABRERA  
 SHEET CHK'D BY: J. DIERCKS  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

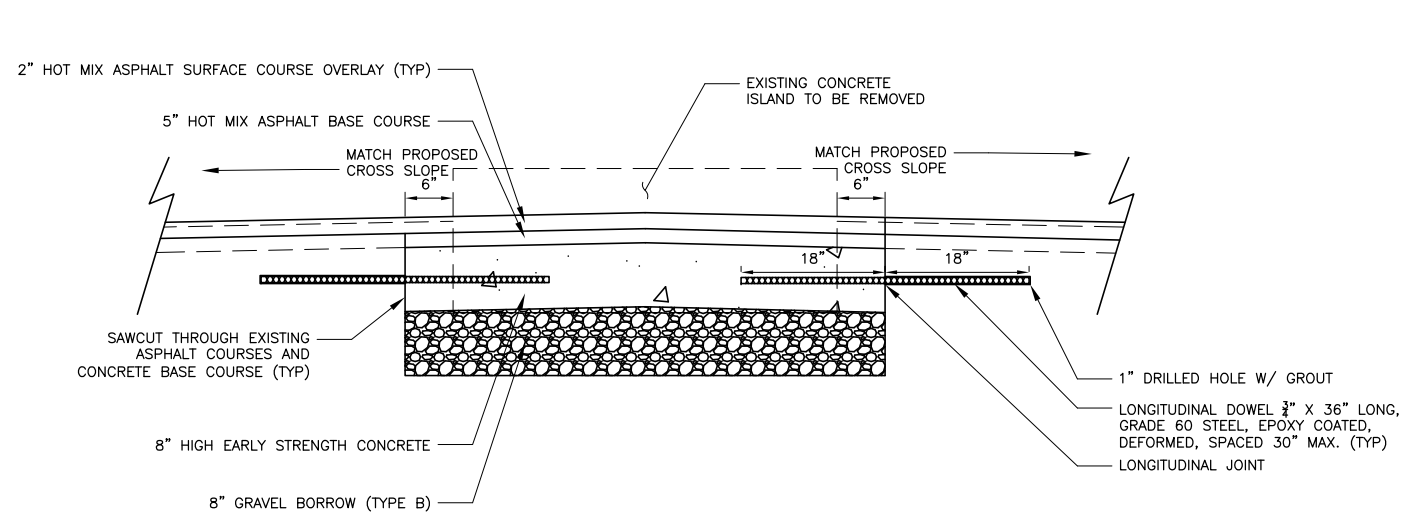
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CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

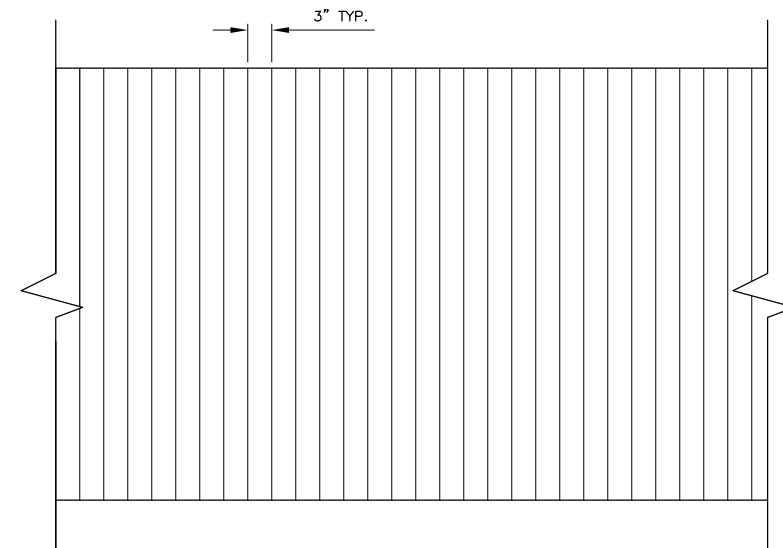
**MISCELLANEOUS DETAILS I**

PROJECT NO. 0139-68660  
 FILE NAME: CSTD001.DWG  
 SHEET NO. 11  
 Accession No: 0139-P-xxxx



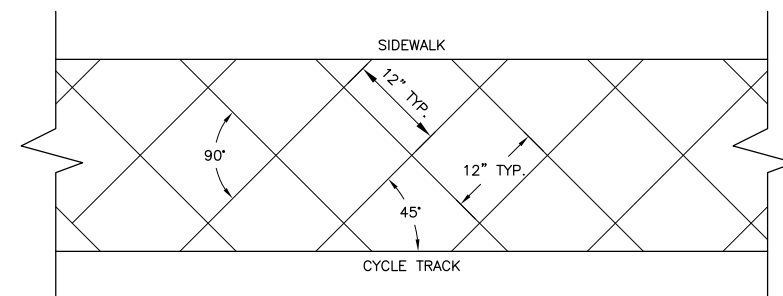
**CONCRETE ISLAND REMOVAL DETAIL**  
STA 103+67 TO STA 105+05 RT

N.T.S.



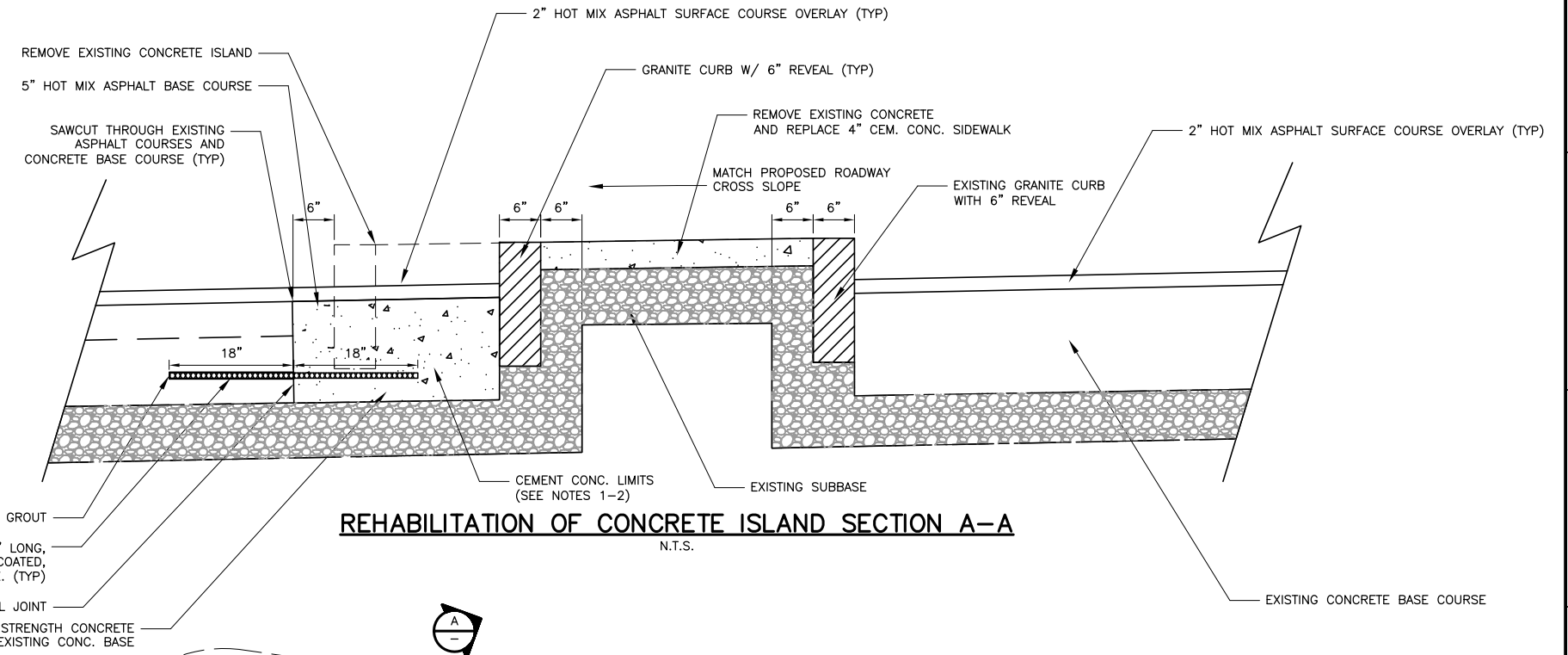
**CONCRETE SCORING DETAIL**

N.T.S.



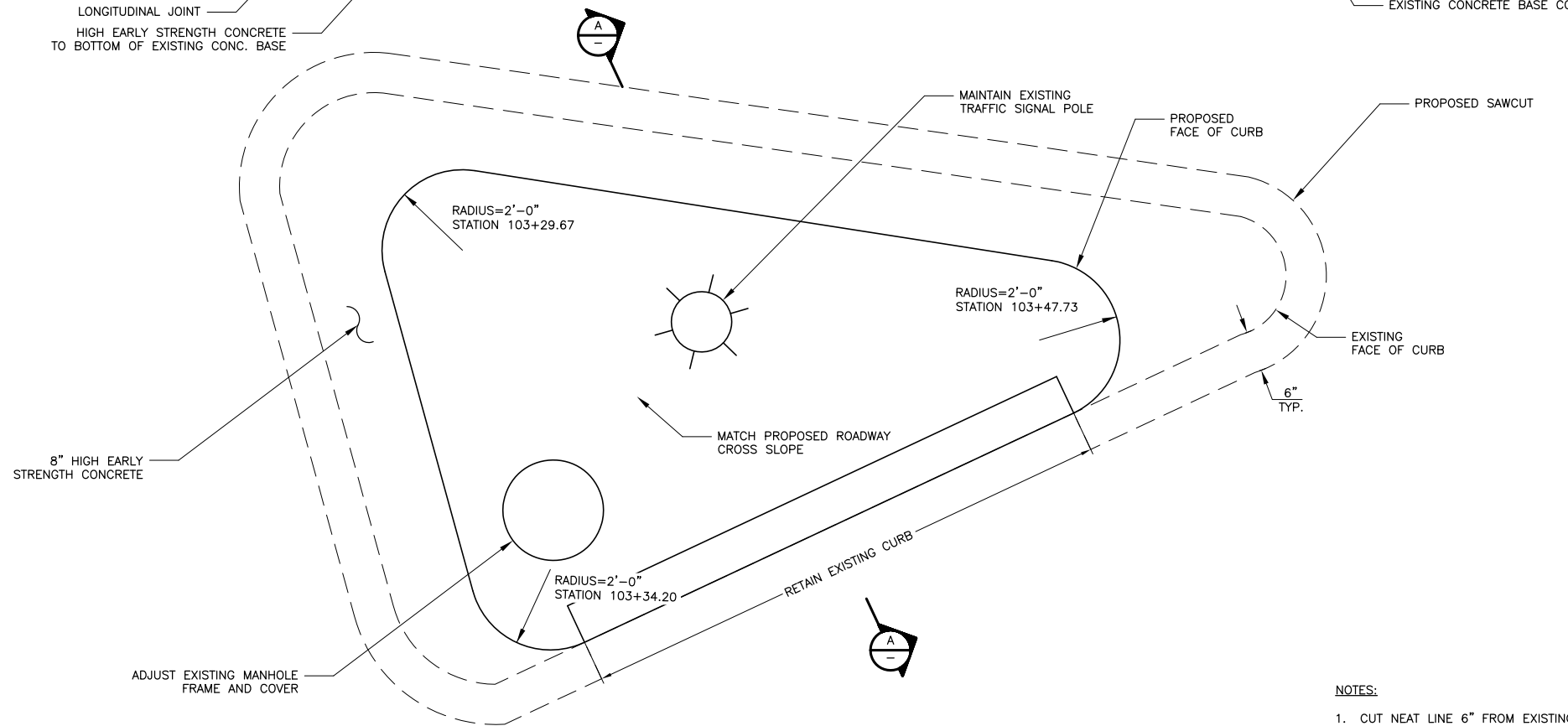
**SCORED CONCRETE BUFFER DETAIL**

N.T.S.



**REHABILITATION OF CONCRETE ISLAND SECTION A-A**

N.T.S.



**REHABILITATION OF CONCRETE ISLAND DETAIL**

N.T.S.

**NOTES:**

1. CUT NEAT LINE 6" FROM EXISTING CURB LINE AND REMOVE BINDER, BASE AND GRAVEL, REPLACE WITH CEMENT CONCRETE.
2. ANY DESIGNATED CEMENT CONCRETE THAT IS ACCEPTABLE UNDER SECTION M4 OF THE STANDARD SPECIFICATIONS MAY BE USED; ALL TEST REQUIREMENTS ARE WAIVED. BITUMINOUS CONCRETE SHALL NOT BE USED AS A SUBSTITUTE.

REV. NO.	DATE	DRWN	CHKD	REMARKS

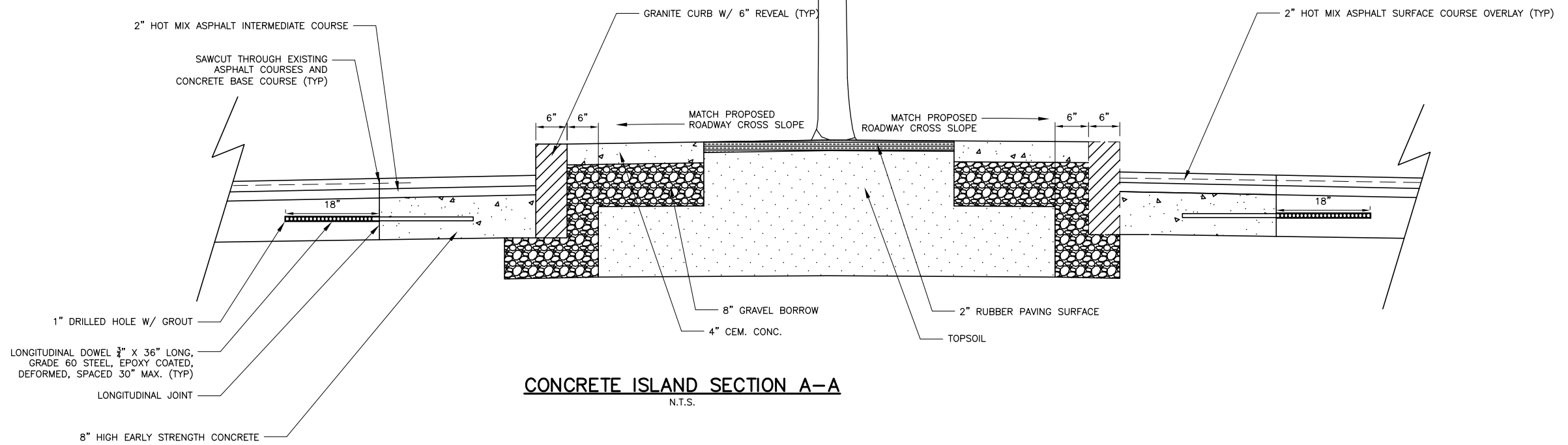
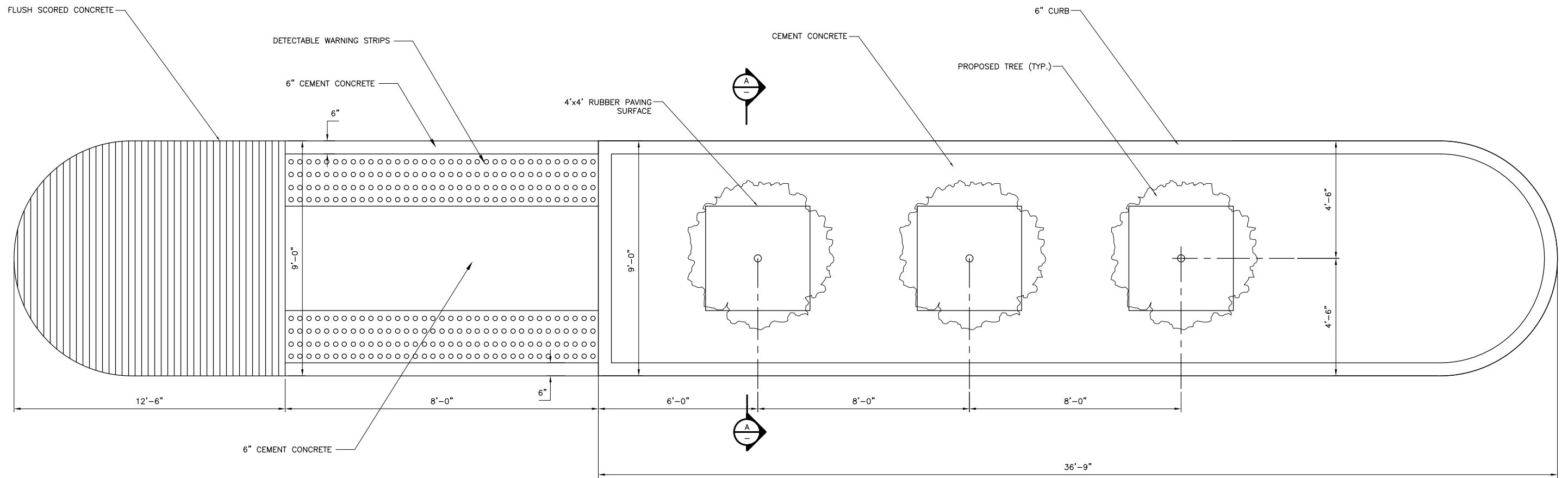
DESIGNED BY: A. LYNCH  
 DRAWN BY: A. LYNCH  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT  
**CONCORD AVENUE**  
**WATER MAIN AND ROADWAY RECONSTRUCTION**

**MISCELLANEOUS DETAILS II**

PROJECT NO. 0139-68660  
 FILE NAME: CSTD1002.DWG  
 SHEET NO.  
**12**  
 Accession No: 0139-P-xxxx



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: A. LYNCH  
 DRAWN BY: K. THOMAS  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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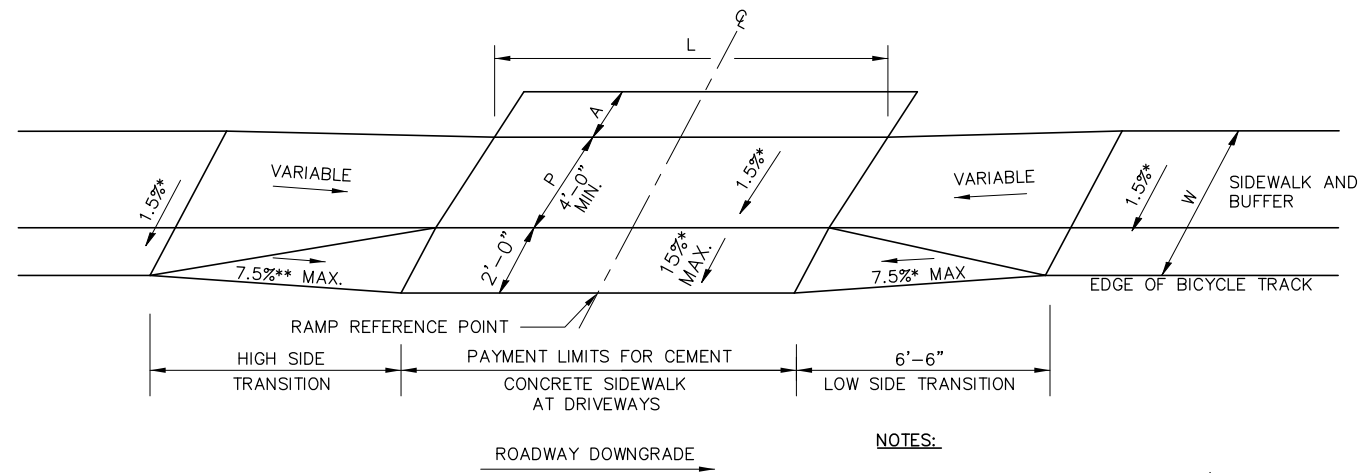
CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**MISCELLANEOUS DETAILS III**

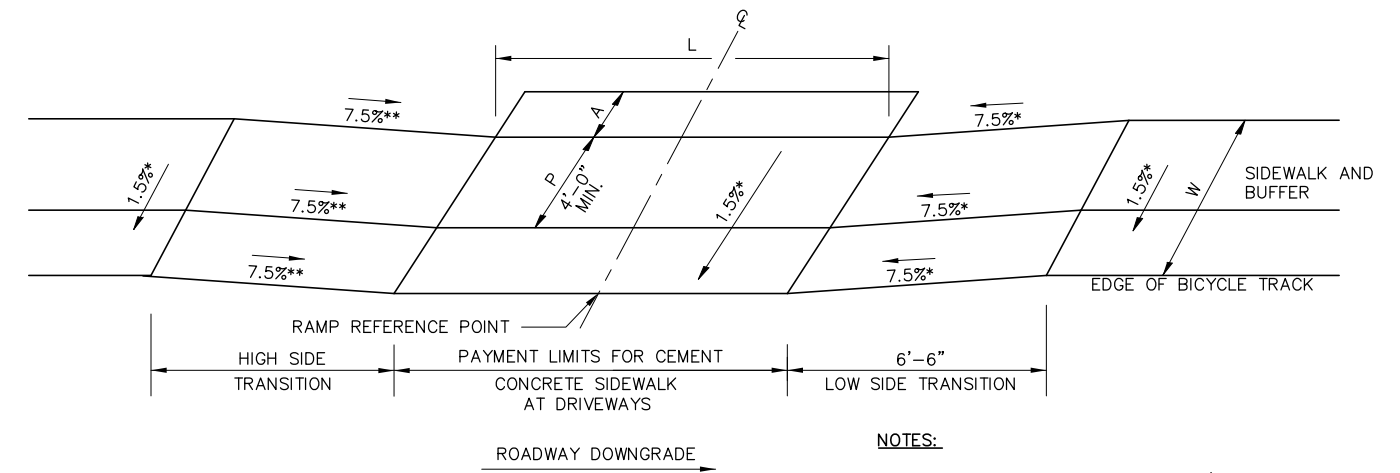
PROJECT NO. 0139-68660  
 FILE NAME: CSTD1002.DWG  
 SHEET NO. 13  
 Accession No: 01330-PP-10004

SIDEWALK THROUGH DRIVEWAY WITHOUT CURB RETURN



- NOTES:
- SEE CONSTRUCTION STANDARD M/E 107.7.0
  - \* CONSTRUCTION TOLERANCE ±0.5%
  - \*\* SEE CONSTRUCTION STANDARD M/E 107.9.0
  - \*\*\*DRIVEWAY HAS A VARYING SLOPE ACROSS L.

SIDEWALK THROUGH DRIVEWAY WITHOUT CURB RETURN



- NOTES:
- SEE CONSTRUCTION STANDARD M/E 107.7.0
  - \* CONSTRUCTION TOLERANCE ±0.5%
  - \*\* SEE CONSTRUCTION STANDARD M/E 107.9.0
  - \*\*\*DRIVEWAY HAS A VARYING SLOPE ACROSS L.

DW#	RAMP REFERENCE POINT		WIDTH OF SIDEWALK (W)	WIDTH OF DRIVEWAY (L)	PATH FOR TRAVEL (P)	AVERAGE LENGTH OF APRON (A)	ROADWAY GUTTER SLOPE	TRANSITION LENGTH	
	STA.	OFFSET						HIGH SIDE	LOW SIDE
1	105+37	22.5' LT	7.0'	34.2'	5.0'	0.0'	-2.25%	11.00'	3.25'
2	105+84	22.5' LT	7.0'	18.6'	5.0'	0.0'	-2.25%	5.50'	6.50'
3	109+50	22.5' LT	7.0'	53.1'	5.0'	7.8'	-1.38%	9.00'	6.50'
4	111+06	22.5' LT	7.0'	33.2'	5.0'	0.0'	-0.72%	3.83'	6.50'
5	111+43	22.5' LT	7.0'	30.0'	5.0'	0.0'	-0.60%	7.67'	6.50'
6	113+03	22.5' LT	7.0'	15.0'	5.0'	0.0'	-0.55%	7.67'	6.50'
7	114+87	22.5' LT	7.0'	15.0'	5.0'	0.0'	-0.55%	7.67'	6.50'
8	115+40	22.5' LT	7.0'	30.0'	5.0'	6.0'	-0.55%	7.67'	6.50'
9	117+02	22.5' LT	7.0'	27.9'	5.0'	3.2'	-0.71%	7.67'	6.50'
10	117+97	22.5' LT	7.0'	20.0'	5.0'	8.0'	-0.71%	7.67'	6.50'
11	118+42	22.5' LT	7.0'	20.0'	5.0'	3.0'	-0.71%	7.67'	6.50'
12	119+93	22.5' LT	7.0'	30.0'	5.0'	0.0'	0.53%	7.67'	6.50'
13	121+71	22.5' LT	7.0'	30.0'	5.0'	0.0'	0.96%	7.67'	6.50'
14	122+19	22.5' LT	7.0'	20.0'	5.0'	0.0'	0.87%	7.67'	6.50'
15	122+78	22.5' LT	7.0'	70.0'	5.0'	0.0'	0.87%	7.67'	6.50'
16	123+61	22.5' LT	7.0'	40.0'	5.0'	0.0'	0.87%	7.67'	6.50'
17	125+26	22.5' LT	7.0'	20.0'	5.0'	0.0'	0.87%	7.67'	6.50'
18	125+69	22.5' LT	7.0'	15.0'	5.0'	1.8'	0.87%	7.67'	6.50'
19	126+44	22.5' LT	7.0'	20.0'	5.0'	1.8'	0.10%	6.50'	6.50'
20	127+47	22.5' LT	7.0'	15.0'	5.0'	0.0'	-0.74%	7.67'	6.50'
21	131+17	22.5' LT	7.0'	35.9'	5.0'	0.0'	-0.54%	7.67'	6.50'
22	132+39	22.5' LT	7.0'	30.0'	5.0'	4.5'	-0.75%	7.67'	6.50'
23	136+75	22.5' LT	7.0'	66.0	5.0'	2.5'	-0.75%	7.67'	6.50'
24	137+89	22.5' LT	7.0'	75.6	5.0'	0.0'	0.40%	7.67'	6.50'

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. MURPHY  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: L. SHERMAN  
 CROSS CHK'D BY: K. JOHNSON  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

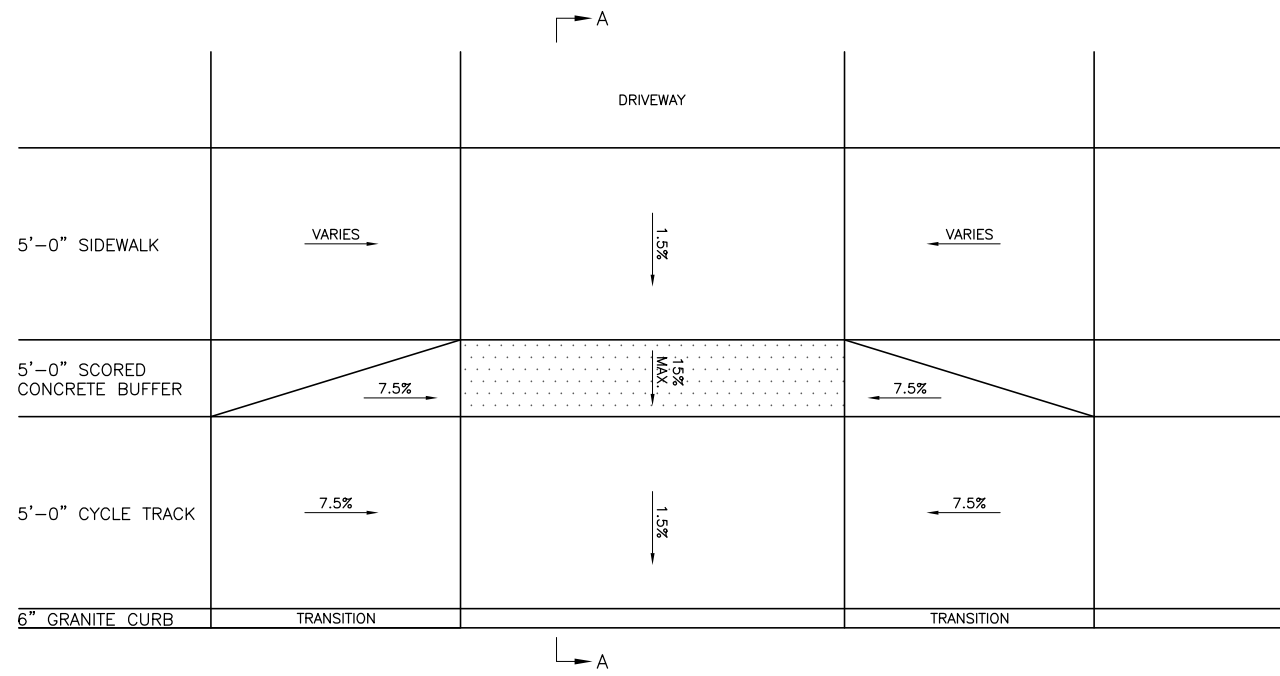
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**DRIVEWAY DETAILS I**

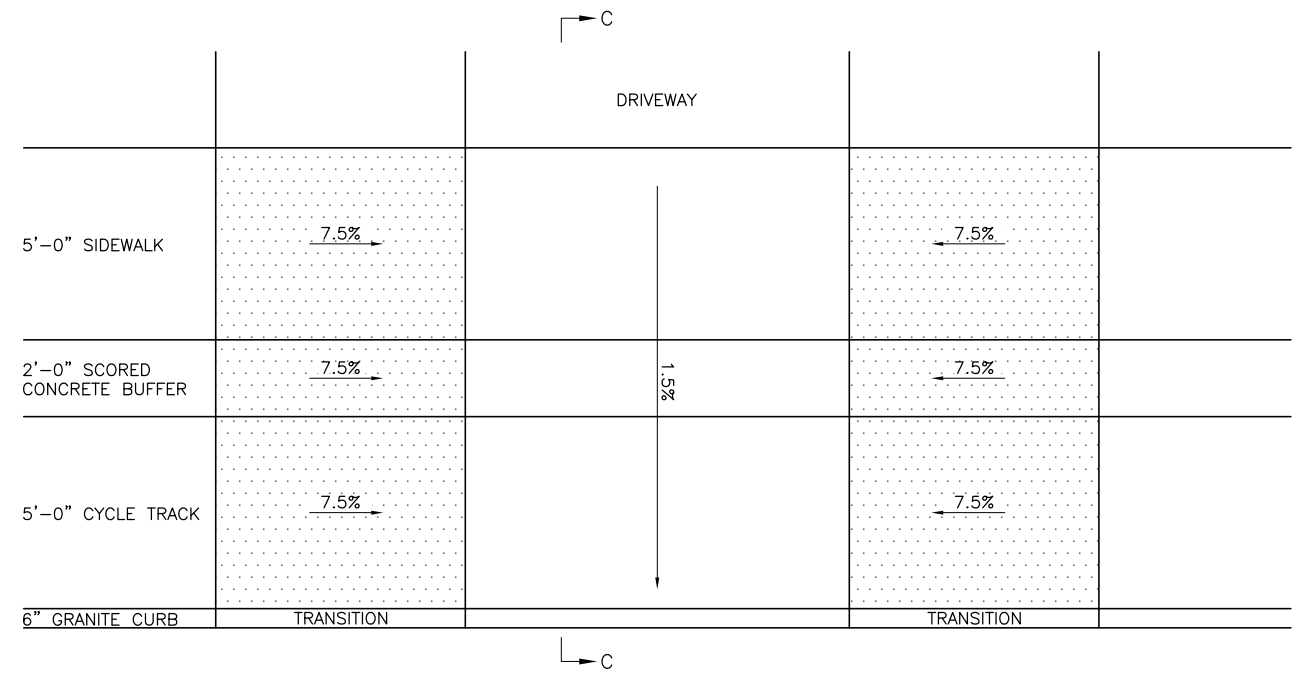
PROJECT NO. 0139-68660  
 FILE NAME: CDWD1001

SHEET NO.  
**14**

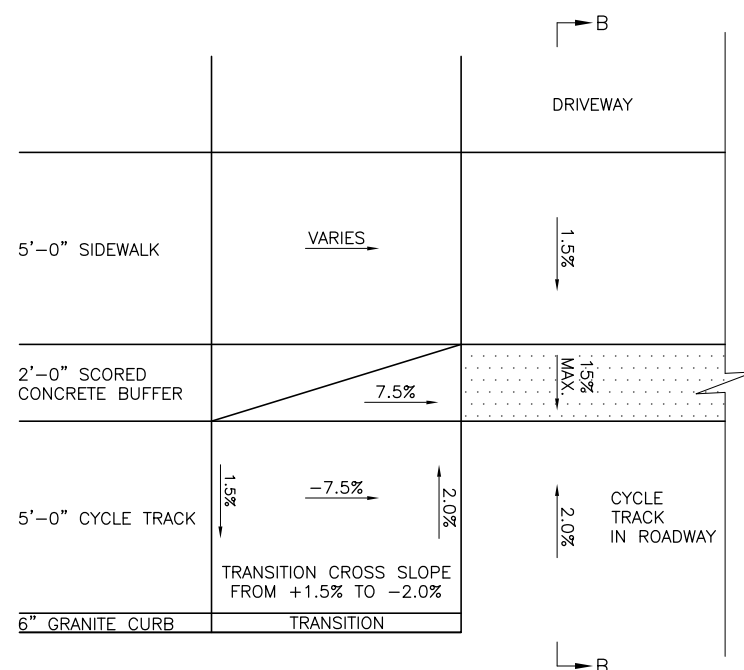
Accession No: 0139-P-xxxx



OPTION #1  
PLAN VIEW

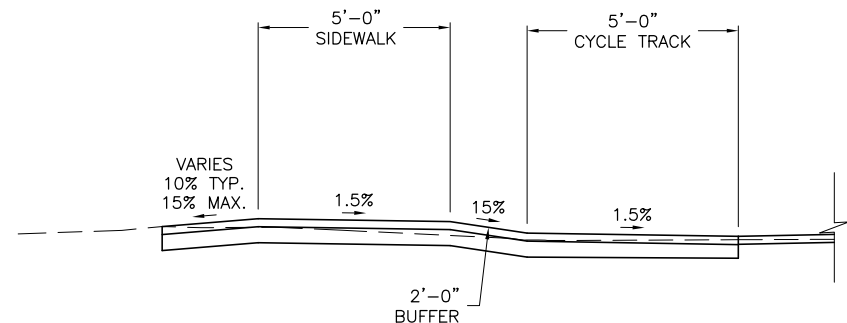


OPTION #2  
PLAN VIEW

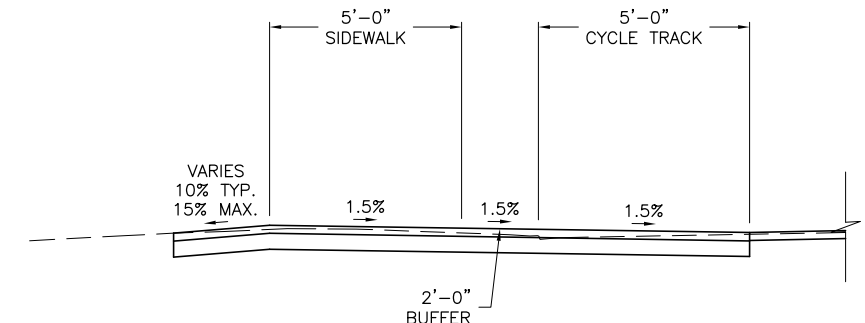


OPTION #1  
PLAN VIEW  
(CYCLE TRACK IN ROADWAY)

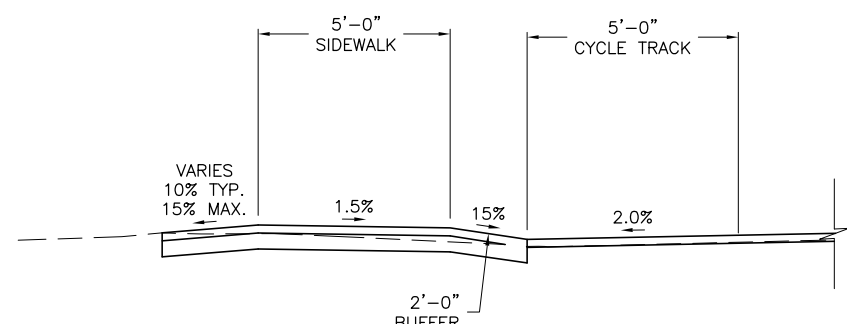
APPLIES TO DRIVEWAYS BETWEEN STATIONS:  
 STA. 101+75 TO STA. 106+07  
 STA. 110+84 TO STA. 112+48  
 STA. 120+69 TO STA. 123+90  
 STA. 136+29 TO STA. 139+50



OPTION #1  
SECTION A-A



OPTION #2  
SECTION C-C



OPTION #1  
SECTION B-B  
(CYCLE TRACK IN ROADWAY)

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. MURPHY  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

**CDM**  
 56 Exchange Terrace  
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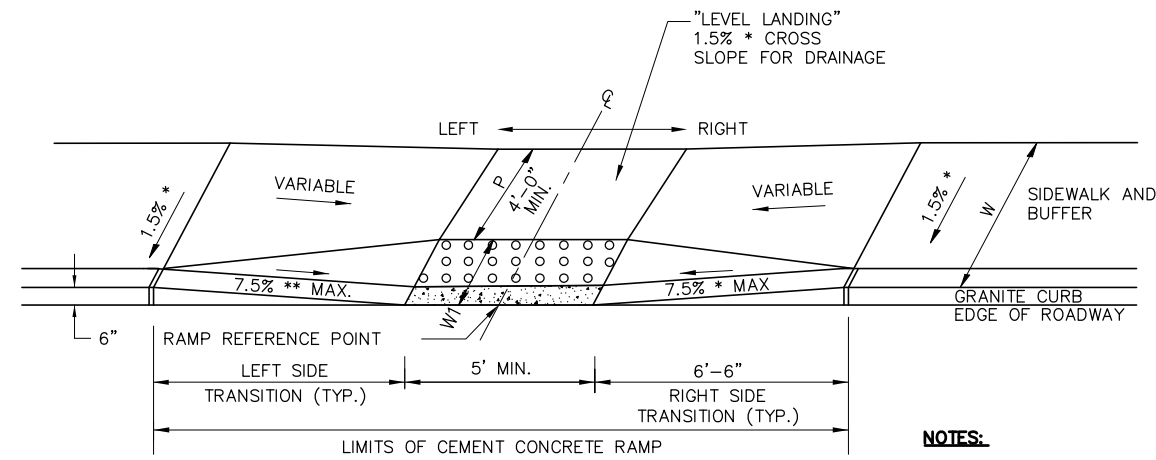
CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT  
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**DRIVEWAY DETAILS II**

PROJECT NO. 0139-68660  
 FILE NAME: CDWDT002  
 SHEET NO.  
**15**  
 Accession No: 0139-P-xxxx



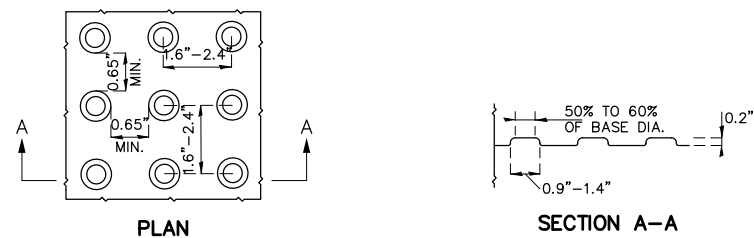
### WHEELCHAIR RAMP PERPENDICULAR



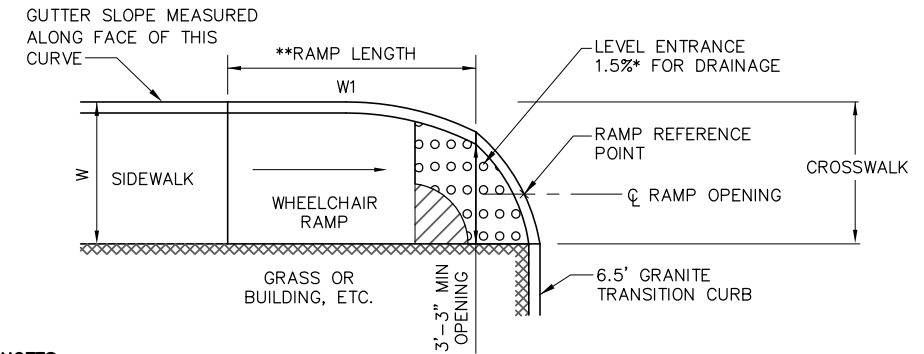
- NOTES:**
- SEE CONSTRUCTION STANDARD M/E 107.2.0
  - \* CONSTRUCTION TOLERANCE ±0.5%
  - \*\* SEE CONSTRUCTION STANDARD M/E 107.9.0

WCR#	RAMP REFERENCE POINT		LENGTH OF PRIMARY RAMP (W1)	WIDTH OF SIDEWALK & BUFFER (W)	WIDTH OF RAMP	PATH FOR TRAVEL (P)	ROADWAY GUTTER SLOPE		TRANSITION LENGTH	
	STA.	OFFSET					LEFT	RIGHT	LEFT	RIGHT
1	103+47.45	28.54' LT	2.00'	6.00'	5.00'	4.00'	-2.60%	-2.60%	11.00'	6.50'
2	103+81.28	28.13' LT	2.00'	7.00'	5.00'	5.00'	2.60%	2.60%	6.50'	11.00'
3	111+84.39	27.91' LT	2.00'	6.00'	5.00'	4.00'	-0.72%	-3.30%	7.67'	6.50'
4	112+13.80	27.98' LT	2.00'	6.00'	5.00'	4.00'	3.30%	-0.40%	6.50'	6.50'
5	112+38.62	22.50' LT	2.00'	7.00'	5.00'	5.00'	-0.40%	-0.40%	7.67'	6.50'
6	112+38.62	22.50' RT	3.00'	7.00'	5.00'	4.00'	0.40%	0.40%	6.50'	7.67'
7	120+78.75	22.50' LT	2.00'	7.00'	5.00'	5.00'	0.96%	0.96%	6.50'	3.83'
8	120+78.75	22.50' RT	3.00'	7.00'	5.00'	4.00'	-0.96%	-0.96%	7.67'	6.50'
11	127+62.58	28.00' RT	2.00'	6.00'	5.00'	4.00'	-1.98%	-1.98%	9.00'	6.50'
12	128+00.00	28.00' RT	2.00'	6.00'	5.00'	4.00'	2.98%	2.98%	6.50'	11.00'
14	128+42.09	28.00' LT	2.00'	6.50'	5.00'	4.50'	0.32%	0.32%	6.50'	3.83'
15	128+56.22	22.50' LT	2.00'	7.00'	5.00'	5.00'	0.32%	-0.74%	3.25'	6.50'
16	128+56.22	22.50' RT	3.00'	7.00'	5.00'	4.00'	0.74%	0.74%	6.50'	7.67'
17	133+76.82	22.50' LT	2.00'	7.00'	5.00'	5.00'	-0.43%	-0.43%	7.67'	6.50'
18	133+76.82	22.50' RT	3.00'	7.00'	5.00'	4.00'	0.43%	0.43%	6.50'	7.67'
19	133+90.36	36.11' LT	2.00'	6.00'	5.00'	4.00'	-3.69%	-3.69%	7.00'	6.50'
20	134+26.09	36.00' LT	2.00'	7.00'	5.00'	5.00'	1.69%	1.69%	6.50'	9.00'
21	138+55.00	22.50' LT	3.00'	7.00'	5.00'	4.00'	-0.51%	-0.51%	7.67'	6.50'

### DETECTABLE WARNING PANEL TYPICAL INSTALLATION



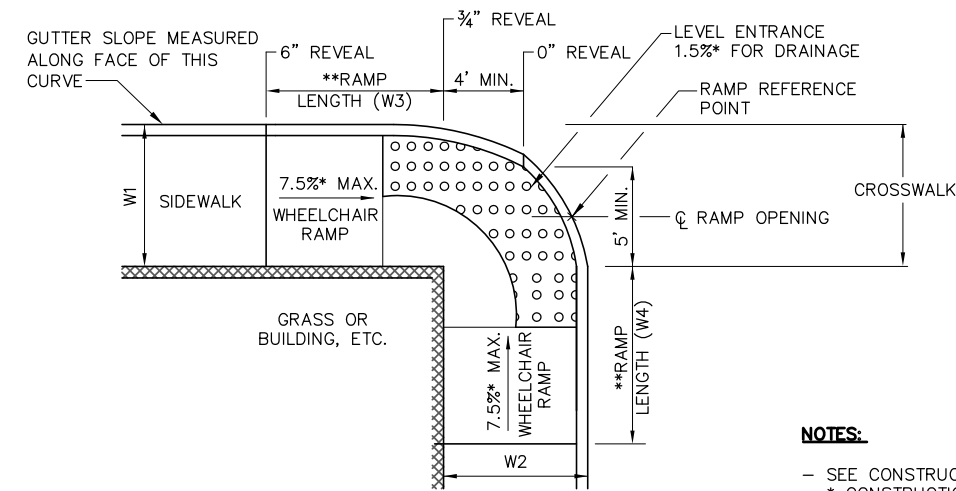
### WHEELCHAIR RAMP SINGLE DIRECTION WITH LEVEL ENTRANCE



- NOTES:**
- SEE CONSTRUCTION STANDARD M/E 107.2.0
  - \* CONSTRUCTION TOLERANCE ±0.5%
  - \*\* SEE CONSTRUCTION STANDARD M/E 107.9.0

WCR#	RAMP REFERENCE POINT		WIDTH OF SIDEWALK & BUFFER (W)	WIDTH OF RAMP OPENING	ROADWAY GUTTER SLOPE	RAMP LENGTH (W1)
	STA.	OFFSET				
9	120+90.42	27.00' LT	7.00'	5.00'	0.96%	3.25'
10	121+16.51	27.00' LT	7.00'	5.00'	0.96%	7.67'

### WHEELCHAIR RAMP FOR 'T' INTERSECTION



- NOTES:**
- SEE CONSTRUCTION STANDARD M/E 107.2.0
  - \* CONSTRUCTION TOLERANCE ±0.5%
  - \*\* SEE CONSTRUCTION STANDARD M/E 107.9.0

WCR#	RAMP REFERENCE POINT		WIDTH OF SIDEWALK & BUFFER (W1)	WIDTH SIDEWALK (W2)	WIDTH OF RAMP OPENING	ROADWAY GUTTER SLOPE		RAMP LENGTH	
	STA.	OFFSET				CONCORD	SIDE ST.	W3	W4
13	128+10.00	27.50' LT	7.00'	6.35'	5.00'	-0.74%	-0.40%	7.67'	6.50'

REV. NO.	DATE	DRWN	CHKD	REMARKS

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 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

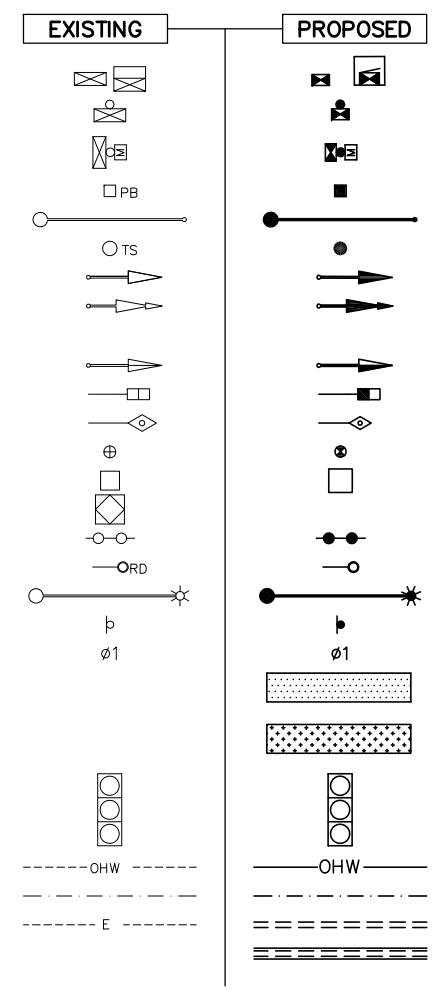
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**WHEELCHAIR RAMP DETAILS**

PROJECT NO. 0139-68660  
 FILE NAME: CDWD1003

SHEET NO.  
**16**

Accession No: 0139-P-xxxx



### TRAFFIC SIGNAL LEGEND

CONTROL CABINET GROUND MOUNTED (WITH & WITHOUT CONC. PAD)  
 CONTROL CABINET POLE MOUNTED  
 FLASHING BEACON CONTROL & METER PEDESTAL  
 PULL BOX (12" x 12" OR AS NOTED)  
 MAST ARM, SHAFT & BASE (ARM LENGTH AS NOTED)  
 SIGNAL POST & BASE (ALPHA-NUMERIC DESIGNATION NOTED)  
 VEHICULAR SIGNAL HEAD (ALPHA-NUMERIC DESIGNATION NOTED)  
 VEHICULAR SIGNAL HEAD, OPTICALLY PROGRAMMED (ALPHA-NUMERIC DESIGNATION NOTED)  
 FLASHING BEACON (ALPHA-NUMERIC DESIGNATION NOTED)  
 PEDESTRIAN SIGNAL HEAD (ALPHA-NUMERIC DESIGNATION NOTED)  
 EMERGENCY PREEMPTION DETECTOR (OPTICOM)  
 PEDESTRIAN PUSH BUTTON, SIGN & SADDLE  
 WIRE LOOP DETECTOR (6' x 6' OR AS NOTED)  
 HIGH MAST POLE OR TOWER  
 MAGNETOMETER  
 RADAR DETECTOR  
 SIGNAL & LIGHTING MAST ARM  
 TRAFFIC SIGN & POST  
 CONTROLLER PHASE ACTUATED  
 ZONE OF DETECTION FOR SPECIAL DETECTORS  
 ZONE OF VISIBILITY FOR PROGRAMMED SIGNAL  
 TRAFFIC SIGNAL HEAD (12" LENSES OR AS NOTED)  
 OVERHEAD WIRE(S)  
 DIRECT BURIAL CABLE  
 TRAFFIC SIGNAL CONDUIT  
 CONDUIT CROSSING ROADWAY WITH FLOWABLE FILL

### GENERAL ABBREVIATIONS

MAX	MAXIMUM
MIN	MINIMUM
BO	BY OTHERS
PROP	PROPOSED
R & D	REMOVE AND DISPOSE
R & R	REMOVE AND RESET
R & S	REMOVE AND STACK
REM	REMOVE
RET	RETAIN

### TRAFFIC ABBREVIATIONS

R	STEADY CIRCULAR RED
Y	STEADY CIRCULAR AMBER
G	STEADY CIRCULAR GREEN
RL	STEADY RED LEFT ARROW
YL	STEADY AMBER LEFT ARROW
GL	STEADY GREEN LEFT ARROW
GV	STEADY GREEN VERTICAL ARROW
RR	STEADY RED RIGHT ARROW
YR	STEADY AMBER RIGHT ARROW
GR	STEADY GREEN RIGHT ARROW
FR	FLASHING CIRCULAR RED
FY	FLASHING CIRCULAR AMBER
FRL	FLASHING RED LEFT ARROW
FRR	FLASHING RED RIGHT ARROW
W	WALK - LUNAR WHITE
DW	DON'T WALK - PORTLAND ORANGE
FDW	FLASHING DON'T WALK - PORTLAND ORANGE
L	DETECTOR - LOCK
NL	DETECTOR - NON-LOCK
	VEHICLE MOVEMENT
	PEDESTRIAN MOVEMENT
	PERMISSIVE VEHICULAR MOVEMENT
	DETECTOR CONTROLLING PHASE

ONLY SHOWN ON PHASING DIAGRAMS

DON'T WALK / WALK

### PAVEMENT MARKING AND SIGNING NOTES

- ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS NOTED OTHERWISE.
- ALL PROPOSED PAVEMENT MARKINGS SHALL BE THERMOPLASTIC.

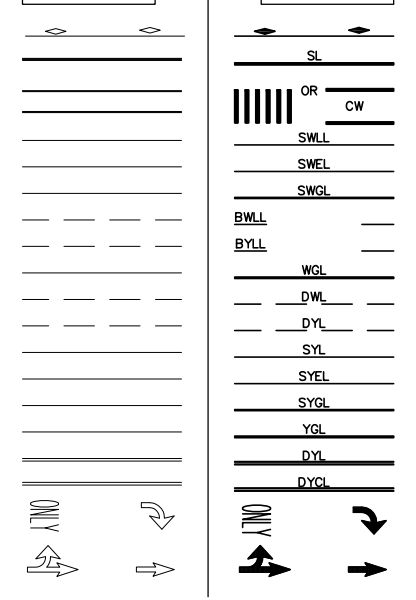
### TRAFFIC SIGNAL NOTES

- CONSTRUCTION OF THE TRAFFIC CONTROL SIGNAL SYSTEMS SHOWN ON THE FOLLOWING DRAWINGS SHALL CONFORM TO THE MASSACHUSETTS HIGHWAY DEPARTMENT'S "STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES", 1988 ED. AS AMENDED, AND THE FEDERAL HIGHWAY ADMINISTRATION'S "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", 2003 EDITION AS AMENDED.
- ALL TRAFFIC CONTROL SIGNAL EQUIPMENT SHALL BE LISTED ON THE CURRENT MASS. HIGHWAY DEPARTMENT'S "APPROVED LIST" AND IS SUBJECT TO THE APPROVAL OF THE DESIGN ENGINEER AND/OR THE MASS. HIGHWAY DEPARTMENT.
- ALL PROPOSED WIRE LOOP DETECTORS SHALL BE CENTERED WITHIN RESPECTIVE LANES UNLESS OTHERWISE NOTED.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING AND VERIFYING THAT THERE IS SUFFICIENT CLEARANCE BETWEEN ALL PROPOSED TRAFFIC SIGNAL POLES AND EXISTING AND RELOCATED OVERHEAD UTILITY LINES. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR COORDINATING WITH THE AFFECTED UTILITY COMPANIES RELATIVE TO THE SCOPE OF ANY REQUIRED RELOCATIONS. THIS SHALL BE PERFORMED WITHIN TEN DAYS AFTER AWARD OF THE CONTRACT. THE COST FOR RELOCATION OF UTILITIES SHALL BE BORNE BY THE OWNER.

### LOOP DETECTOR NOTES

- SEE LOOP DETECTOR DETAIL SHEET FOR SPLICE PATTERN AND OTHER INFORMATION.
- DELAY AND EXTENSION TIMES ARE IN SECONDS.
- DELAY TIME SHALL BE EFFECTIVE ONLY DURING THE RED PORTION OF THE PHASE THAT IS CALLED BY A DETECTOR.

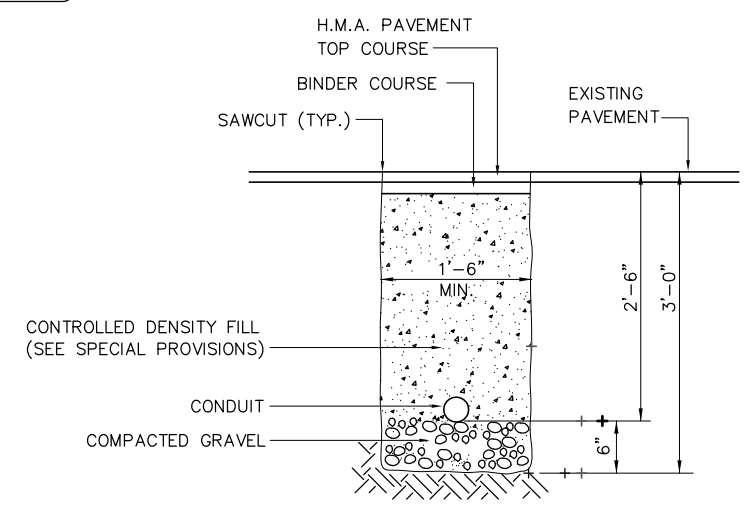
### EXISTING PROPOSED



### PAVEMENT MARKING LEGEND

REFLECTORIZED PAVEMENT MARKER  
 STOP LINE - 12"  
 CROSSWALK - 2x12" WHITE LINES  
 SOLID WHITE LANE LINE - 4" UNLESS NOTED OTHERWISE  
 SOLID WHITE EDGE LINE - 4" UNLESS NOTED OTHERWISE  
 SOLID WHITE GORE LINE - 8"  
 \*BROKEN WHITE LANE LINE - 4" UNLESS NOTED OTHERWISE  
 \*BROKEN YELLOW LANE LINE - 4" UNLESS NOTED OTHERWISE  
 WHITE GORE LINE - 12"  
 \*\*DASHED WHITE LINE - 4"  
 \*\*DASHED YELLOW LINE - 4"  
 SOLID YELLOW LINE - 4" UNLESS NOTED OTHERWISE  
 SOLID YELLOW EDGE LINE - 4" UNLESS NOTED OTHERWISE  
 SOLID YELLOW GORE LINE - 8"  
 YELLOW GORE LINE - 12"  
 DOUBLE YELLOW LINE - 2x4" UNLESS NOTED OTHERWISE  
 DOUBLE YELLOW CENTER LINE - 2x4" UNLESS NOTED OTHERWISE  
 PAVEMENT ARROW & LEGEND  
 PAVEMENT ARROWS

\* BROKEN LANE LINES TO BE 10' IN LENGTH WITH 30' GAP (TYP.)  
 \*\* DASHED LINES TO BE 5' IN LENGTH WITH 5' GAP (TYP.)



NOTE: FLOWABLE MIX TRENCH REQ'D ONLY IN AREAS OF EXIST. ROADWAY PAVEMENT THAT DO NOT REQUIRE FULL DEPTH CONSTRUCTION.

### TRAFFIC SIGNAL CONDUIT TRENCH DETAIL

NOT TO SCALE

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: A. LYNCH	 56 Exchange Terrace Providence, RI 02903 Tel: (401) 751-5360 consulting • engineering • construction • operations
DRAWN BY: A. LYNCH	
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CROSS CHK'D BY: L. SHERMAN	
APPROVED BY: L. SHERMAN DATE: JANUARY 2010	

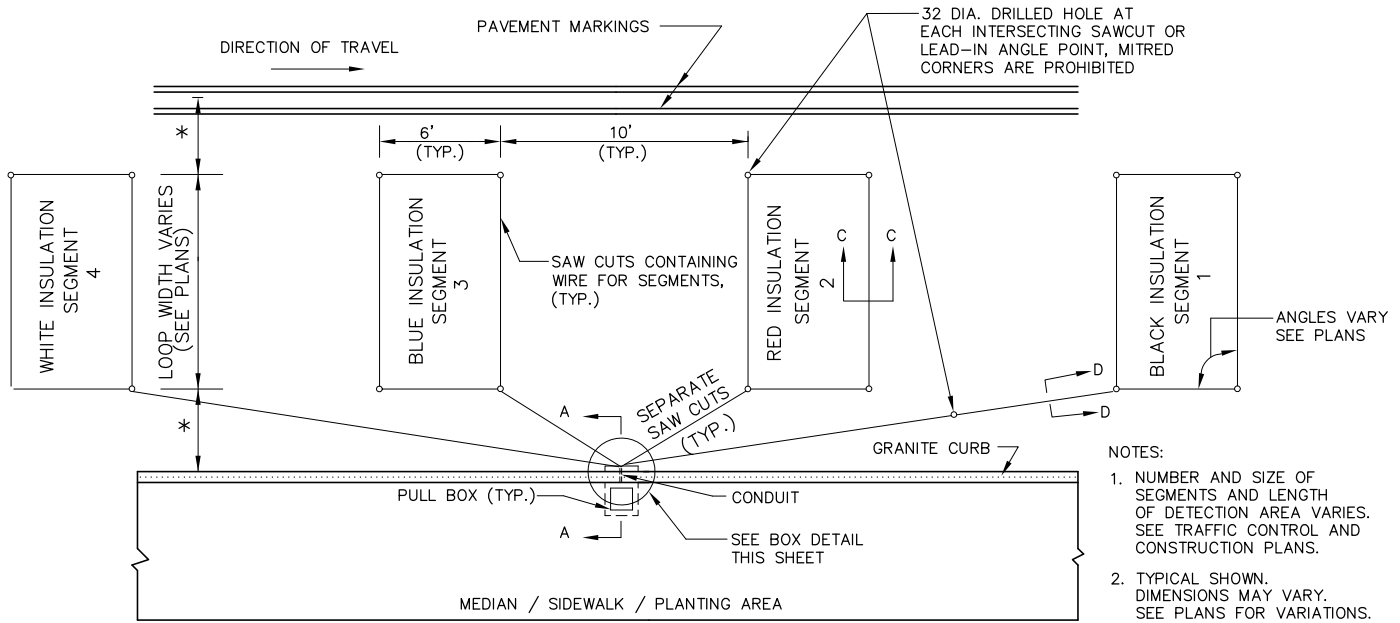
CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT  
**CONCORD AVENUE**  
**WATER MAIN AND ROADWAY RECONSTRUCTION**

**TRAFFIC SIGNAL LEGEND, ABBREVIATIONS & NOTES**

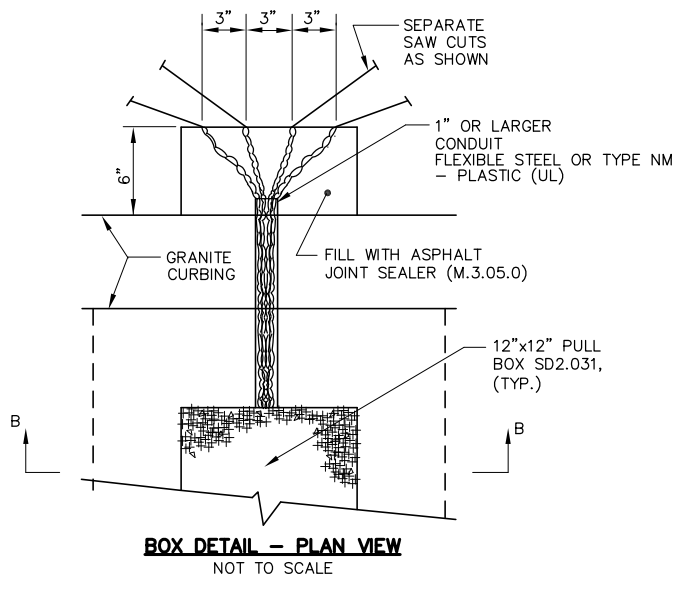
PROJECT NO. 0139-68660
FILE NAME: CSTDL001
SHEET NO. 17
Accession No: 0139-P-xxxx

**DETECTOR NOTES**

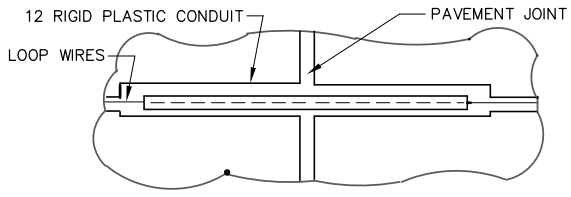
- IN PULL BOX, SPLICE ALL SEGMENTS TO TYPE II-SHIELDED LOOP DETECTOR LEAD-IN CABLE I.M.S.A. SPEC. NO. 50-2 (M8, 16, II). SEGMENTS SHALL BE SPLICED IN PARALLEL, IN SERIES, OR IN A COMBINATION OF PARALLEL & SERIES AS SHOWN ON THE PLAN SHEET FOR EACH DETECTOR. NUMBER OF TURNS OF WIRE SHALL ALSO BE AS SHOWN ON THE PLAN SHEET FOR EACH DETECTOR. SEE NOTES 12 & 13 BELOW.
- SEE SPECIAL PROVISIONS FOR REQUIREMENTS OF DETECTOR AMPLIFIER.
- LEAD IN WIRES SHALL BE TWISTED FROM SEGMENT TO SPLICE WITH SHIELDED CABLE AT FIVE TURNS PER FOOT.
- BEFORE STARTING ANY SPLICING, THE ELECTRICAL CONTRACTOR SHALL FURNISH DATA SHEETS ON THE MATERIALS AND/OR METHODS TO BE USED IN ACCORDANCE WITH THE DEPARTMENT'S STANDARD OPERATING PROCEDURES FOR APPROVAL OF SHOP DRAWINGS SEE SECTION 815.64, ESPECIALLY PARAGRAPH 1.
- THE METALLIC SHIELD WHICH SHALL ENCASE THE DETECTOR LEADS FROM A SPLICE (TYPICALLY LOCATED IN A PULL BOX NEAR THE ROADWAY COMPONENT OF THE DETECTOR) TO THE CONTROLLER, AND THE DRAIN WIRE UNDER THE METALLIC SHIELD, SHALL NOT BE GROUNDED TO THE EARTH GROUNDING BUSS IN THE CONTROLLER, AND THE SHIELD AND DRAIN WIRE SHALL BE CAREFULLY INSULATED FROM THE TRANSFORMER NEUTRAL OR FROM EARTH GROUND AT ALL POINTS ALONG ITS LENGTH. SPECIFICALLY, THIS INCLUDES CAREFUL INSULATION OF THE EXPOSED PORTION OF THE SHIELD AND THE DRAIN WIRE AT THE END AWAY FROM THE CONTROLLER WHERE IT IS SPLICED TO WIRES LEADING TO THE ROADWAY COMPONENT OF THE DETECTOR. THIS IS IMPORTANT TO AVOID A GROUND RETURN LOOP.
- FILL ALL CONDUIT OPENINGS WITH DUCT SEAL.
- AFTER SAW CUTS ARE COMPLETE, BLOW OUT WATER WITH OIL-FREE COMPRESSED AIR UNTIL CUTS ARE CLEAN AND DRY. INSERT WIRE INTO CLEAN SLOT WITH A BLUNT, SMOOTH, ROUND EGED TOOL OF WOOD OR PLASTIC SUCH AS A PAINT STIRRER. DO NOT USE A SCREWDRIVER. THEN INSERT FOAM PLASTIC HOLD-DOWN STRIPS, SIMILAR TO ETHA FOAM SB. STRIPS SHALL BE ABOUT 2" LONG, PLACED IN THE SLOT ABOUT EVERY 2'. THEN POUR SEALER, TAKING CARE TO ELIMINATE BUBBLES. DO NOT ALLOW OVERFLOW TO REMAIN ON TOP COURSE OF PAVEMENT.
- THE COMBINED ROADWAY LOOP, TWISTED LEAD-IN WIRES, SPLICE AND SHIELDED LEAD-IN CABLE SHALL HAVE A RESISTANCE TO GROUND OF AT LEAST 100 MEGOHMS. SEE SPECIAL PROVISIONS FOR ADDITIONAL REQUIREMENTS.
- FOR INSTALLATION OF SINGLE (ONE SEGMENT) SMALL WIRE LOOP DETECTOR, DETAIL IS THE SAME.
- CUT LOOPS IN SURFACE COURSE IN ALL CASES UNLESS ROADWAY OWNER REQUIRES OTHERWISE.
- DETECTOR WIRE SHALL BE A DIFFERENT COLOR FOR EACH SEGMENT OF A DETECTOR GROUP.
- SPLICING PATTERN S/P = SERIES/PARALLEL: SPLICE SEGMENTS 1 AND 3 OF AN INDIVIDUAL DETECTOR IN SERIES. SPLICE SEGMENTS 2 AND 4 IN SERIES. SPLICE THE RESULTANT TWO GROUPS IN PARALLEL. SPLICE THE RESULTANT COMBINATION TO ONE LEAD-IN CABLE. CONNECT THIS CABLE TO AN OTHERWISE UNUSED AMPLIFIER CHANNEL.
- SPLICING PATTERN S = SERIES: SPLICE ALL SEGMENTS (TYPICALLY FOUR, BUT MAY BE LESS) OF AN INDIVIDUAL DETECTOR IN SERIES. SPLICE THE RESULTANT COMBINATION TO ONE LEAD-IN CABLE TO AN OTHERWISE UNUSED AMPLIFIER CHANNEL. P = PARALLEL: SPLICE ALL SEGMENTS OF AN INDIVIDUAL DETECTOR IN PARALLEL. SPLICE THE RESULTANT COMBINATION TO ONE LEAD-IN CABLE TO AN OTHERWISE UNUSED AMPLIFIER CHANNEL.
- FOR THIS PROJECT, USE POLYETHYLENE SEALER. DO NOT USE EPOXY PRODUCTS.
- ALL DIMENSIONS ARE IN INCHES UNLESS SHOWN OTHERWISE.



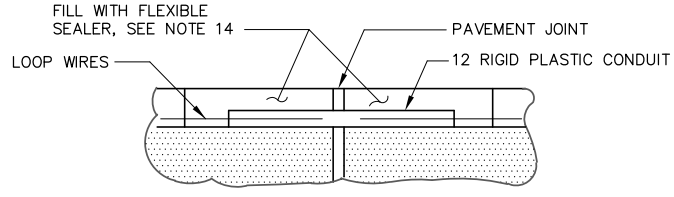
**PLAN OF SEGMENTED DETECTOR DETAIL**  
NOT TO SCALE



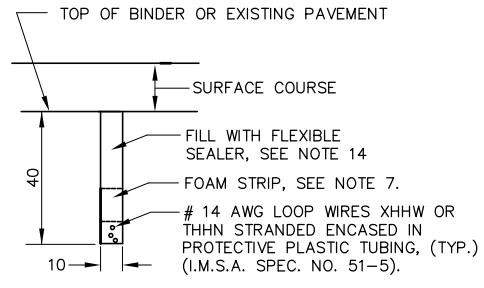
**BOX DETAIL - PLAN VIEW**  
NOT TO SCALE



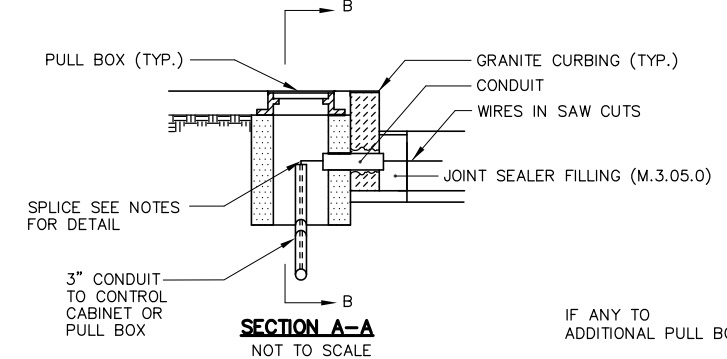
**PLAN**  
TREATMENT AT PAVEMENT JOINTS  
NOT TO SCALE



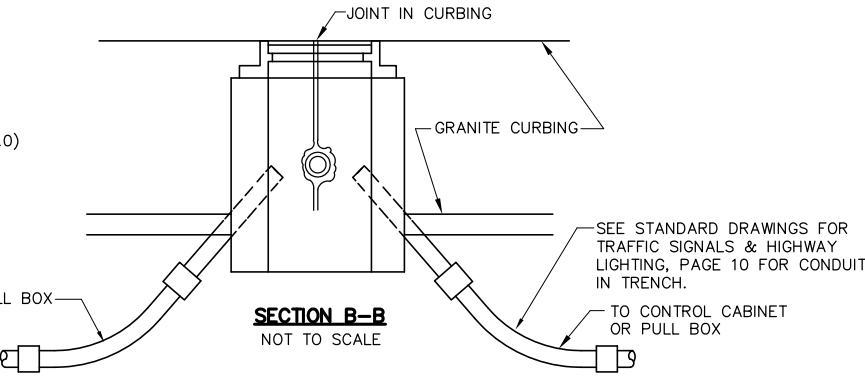
**VERTICAL SECTION**  
TREATMENT AT PAVEMENT JOINTS  
NOT TO SCALE



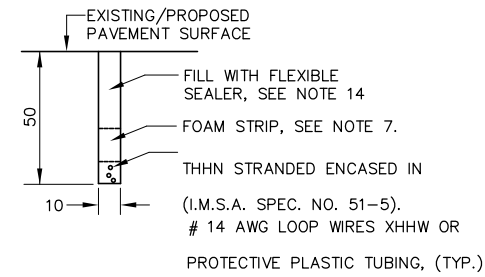
**SECTION C-C & D-D**  
LOOPS IN BINDER COURSE  
NOT TO SCALE



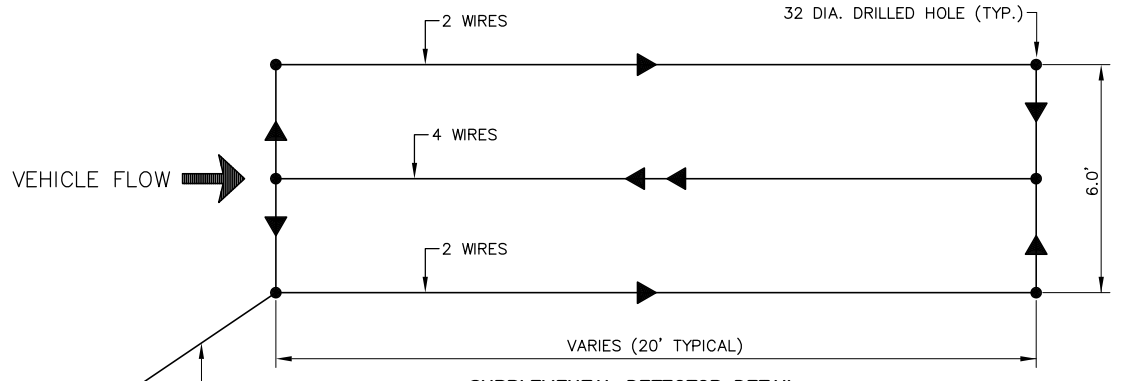
**SECTION A-A**  
NOT TO SCALE



**SECTION B-B**  
NOT TO SCALE



**SECTION C-C & D-D**  
LOOPS IN SURFACE COURSE  
NOT TO SCALE



**SUPPLEMENTAL DETECTOR DETAIL**  
QUADRUPOLE TYPE LOOP DETECTOR INSTALLATION  
NOT TO SCALE

THIS DETAIL IS INTENDED TO SHOW THE LOOP DETECTOR CONFIGURATION ONLY. REFER TO THE STANDARD LOOP DETECTOR DETAILS (SHOWN ON THIS SHEET) FOR OTHER DETAILS SUCH AS PULL BOXES, SAW CUTTING, ETC.

THE TYPICAL QUADRUPOLE TYPE LOOP DETECTOR INSTALLATION CONSISTS OF ONE OR MORE 6' x 20' RECTANGULAR LOOP(S) WITH A CENTER CUT WHICH HAS TWICE THE WINDINGS AS THE PERIMETER CUTS. FOR A 20' LONG INSTALLATION, THE WIRES WILL CONSIST OF A "2-4-2" CONFIGURATION INDICATING 2 PERIMETER WIRES AND 4 CENTER WIRES. FOR A 6' x 40' OR 6' x 50' LOOP, THE NUMBER OF WINDINGS AND CONFIGURATION WILL BE "1-2-1".

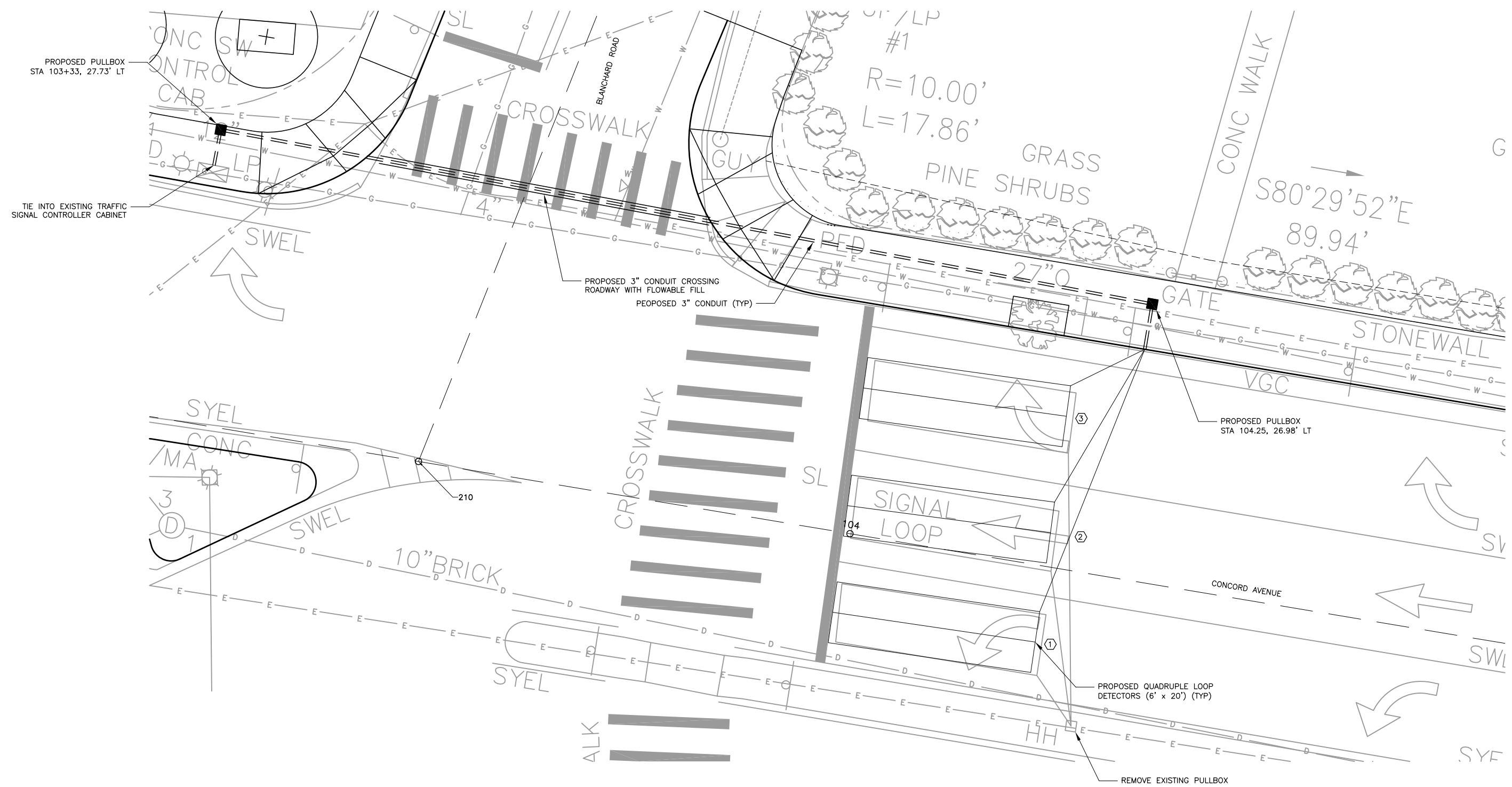
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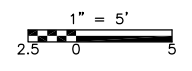
CITY OF CAMBRIDGE, MASSACHUSETTS  
DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT  
**CONCORD AVENUE**  
**WATER MAIN AND ROADWAY RECONSTRUCTION**

**VEHICLE LOOP DETECTION DETAILS**

PROJECT NO. 0139-68660  
FILE NAME: CSTDL002  
SHEET NO. 18  
Accession No: 0139-P-xxxx



**INDUCTANCE LOOP LAYOUT PLAN**



MAJOR ITEMS REQUIRED	
QUANTITY	DESCRIPTION
3 EA	QUADRUPLE LOOP DETECTORS (6' x 20')
3 EA	LOOP DETECTOR AMPLIFIERS
2 EA	PULLBOXES
69 LF	3" CONDUIT
32 LF	3" TRAFFIC SIGNAL CONDUIT CROSSING ROADWAY WITH FLOWABLE FILL

PLUS ALL MISCELLANEOUS EQUIPMENT AND MATERIAL NECESSARY TO PROVIDE A COMPLETE OPERATING TRAFFIC CONTROL SIGNAL.

LOOP DETECTOR DATA									
DETECTION ZONE	NO. OF SEGMENTS	LOOP SIZE	SPICE PATTERN	NO. OF TURNS	φ CALLED	φ EXT.	MODE A=PULSE B=PRESENCE	DELAY TIME	EXT. TIME
①	1	6' X 20'	QUADRUPLE TYPE Q		-	-	B	-	-
②	1	6' X 20'	QUADRUPLE TYPE Q		-	-	B	-	-
③	1	6' X 20'	QUADRUPLE TYPE Q		-	-	B	-	-

REV. NO.	DATE	DRWN	CHKD	REMARKS

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CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**VEHICLE LOOP DETECTION PLAN**

PROJECT NO. 0139-68660  
 FILE NAME: CSTDL003

SHEET NO.  
**19**

Accession No: 0139-P-xxxx

**EROSION CONTROL NOTES:**

**GENERAL**

IT IS THE INTENT OF THE CONTRACT PLANS AND DETAILS TO CONTROL EROSION AND SEDIMENTATION IN ALL PORTIONS OF THE SITE. THE CONTRACTOR IS ALERTED THAT CONTROL OF EROSION AND SEDIMENTATION IS CONSIDERED TO BE ESPECIALLY IMPORTANT IN AND AROUND THE AREAS SHOWN ON THE PLANS AND DELINEATED AS WETLANDS. THE CONTRACTOR IS TO IMPLEMENT THE EROSION AND SEDIMENTATION CONTROLS INDICATED ON THE PLANS, IN ACCORDANCE WITH THE FOLLOWING NOTES, BUT IS ALERTED TO THE FACT THAT ADDITIONAL MEASURES MAY BE REQUIRED TO COMPLY WITH THIS INTENT, AS FIELD CONDITIONS MAY WARRANT. SHOULD SUCH MEASURES BE DETERMINED TO BE REQUIRED OR ORDERED BY THE ENGINEER, THEY ARE TO BE IMPLEMENTED IMMEDIATELY.

- ALL WORK SHALL BE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, THE PROVISIONS OF ALL APPLICABLE PERMITS AND APPROVALS ISSUED BY LOCAL, STATE & FEDERAL REGULATION FOR ACTIVITIES INVOLVING WETLANDS, WATERCOURSES AND/OR EROSION CONTROLS, AND AS DIRECTED BY THE ENGINEER. ALL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE MASSACHUSETTS EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS, MARCH 1997 AND THE U.S.D.A. SCS'S EROSION AND SEDIMENT CONTROL IN SITE DEVELOPMENT, MASSACHUSETTS CONSERVATION GUIDE, SEPTEMBER 1983.
- TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE COMMENCEMENT OF ANY SITEWORK, SHALL BE MAINTAINED DURING CONSTRUCTION, AND SHALL REMAIN IN PLACE UNTIL ALL SITEWORK IS COMPLETED AND GROUND COVER IS ESTABLISHED (AT LEAST 75% UNIFORM COVERAGE BY NEW SEEDLINGS).
- ALL EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE MAINTAINED IN EFFECTIVE CONDITION THROUGHOUT THE CONSTRUCTION PERIOD. THE CONTRACTOR SHALL INSPECT THE EROSION CONTROLS DAILY AND CLEAN ACCUMULATED MATERIALS FROM BEHIND THEM, AS NECESSARY. ALL EROSION AND SEDIMENTATION CONTROL MEASURES FOUND TO BE IN NEED OF REPAIR OR REPLACEMENT SHALL BE IMMEDIATELY CORRECTED, SO AS TO MAINTAIN THE INTEGRITY OF THE EROSION AND SEDIMENTATION CONTROL SYSTEM.
- SEDIMENT REMOVED FROM CONTROL STRUCTURES SHALL BE DISPOSED IN A MANNER DESCRIBED IN THE MAINTENANCE PLAN FILED WITH THE CONSERVATION COMMISSION. NO EQUIPMENT OR MATERIAL OF ANY KIND SHALL BE STOCKPILED OR DEPOSITED IN ANY REGULATED AREA, UNLESS SPECIFICALLY SHOWN ON THE CONTRACT PLANS OR AUTHORIZED BY PROJECT PERMITS/APPROVALS.
- STOCKPILED SOIL SHALL BE SURROUNDED WITH SILTATION FENCES TO PREVENT AND CONTROL SILTATION AND EROSION. STOCKPILES THAT WILL REMAIN EXPOSED FOR MORE THAN 30 DAYS, SHALL BE STABILIZED WITH MULCH OR SEEDED FOR TEMPORARY VEGETATIVE COVER.
- ALL DISTURBED AREAS THAT WILL REMAIN EXPOSED OR UNDISTURBED FOR A PERIOD OF FOURTEEN (14) DAYS OR LONGER, SHALL BE STABILIZED WITH MULCH OR SEEDED FOR TEMPORARY VEGETATIVE COVER.
- CULVERT/PIPE INLETS AND OUTFALLS SHALL BE STABILIZED WITH STONE FOR PIPE ENDS OR OTHER APPROVED PERMANENT EROSION CONTROL MEASURES, IMMEDIATELY FOLLOWING PIPE INSTALLATION.
- THERE SHALL BE NO DIRECT DISCHARGE FROM ANY REQUIRED DEWATERING OPERATIONS INTO ANY WETLAND, WATERCOURSE, OR DRAINAGE SYSTEM, WITHOUT THE APPROVAL OF THE ENGINEER, AND THEN ONLY AS ALLOWED BY REGULATORY PERMITS. ANY DEWATERING DISCHARGE CONTAINING SETTLEABLE SOLIDS (SEDIMENTS) SHALL BE PASSED THROUGH A SEDIMENTATION CONTROL BASIN OR SIMILAR TREATMENT, APPROVED BY THE ENGINEER, TO REMOVE THESE SOLIDS. CONTRACTOR SHALL MAINTAIN SAID SEDIMENT CONTROL DEVICE THROUGHOUT THE ENTIRE DEWATERING OPERATION AND SHALL CEASE DEWATERING, IF DEFICIENCIES ARE NOTED, UNTIL THE DEFICIENCIES ARE CORRECTED.
- EARTHWORK ACTIVITY SHALL BE PERFORMED IN A MANNER SUCH THAT RUNOFF IS DIRECTED TO THE TEMPORARY DRAINAGE SWALES AND SEDIMENTATION BASINS. IN NO CASE SHALL RUNOFF FROM ROADWAYS OR OTHER AREAS, UPGRADIENT FROM EMBANKMENTS, BE ALLOWED TO RUN DOWN ANY CUT OR FILL SLOPE, WITHOUT THE APPROVAL OF THE ENGINEER.
- THE CONTRACTOR SHALL INSPECT ALL PORTIONS OF THE SITE IN ANTICIPATION OF RAINFALL EVENTS TO DETERMINE IF SITE GRADING IS SUFFICIENT TO PREVENT EROSION OF SLOPES AND/OR THE TRANSPORTATION OF SEDIMENTS TO WETLANDS OR WATERCOURSES, WITHIN THE PROJECT LIMITS. SHOULD ADDITIONAL MEASURES BE REQUIRED, THEY ARE TO BE IMPLEMENTED IMMEDIATELY. IN NO CASE SHALL THE INSTALLATION OF ADDITIONAL MEASURES, NECESSARY TO PROTECT SLOPES WITHIN THE PROJECT LIMITS, BE DELAYED BEYOND THE COMMENCEMENT OF PRECIPITATION.
- PROPOSED STORM WATER TREATMENT BASINS SHALL BE USED AS TEMPORARY SEDIMENTATION BASINS THROUGHOUT CONSTRUCTION OF ADJACENT ROADWAYS AND EMBANKMENTS, AND STORM WATER FROM CONSTRUCTION ACTIVITIES SHALL BE ROUTED TO THESE BASINS AS NECESSARY, TO PROTECT LOCAL WETLANDS AND WATERCOURSES FROM SILTATION. BASINS SHALL BE CLEANED OF SEDIMENT, AS REQUIRED, DURING THIS CONSTRUCTION. UPON THE COMPLETION OF THE CONSTRUCTION ACTIVITIES IN THE AREA TRIBUTARY TO A PARTICULAR BASIN, THE BASIN SHALL BE THOROUGHLY CLEANED OF SEDIMENT AND THEN GRADED AND PLANTED AS SHOWN ON THE CONTRACT PLANS.

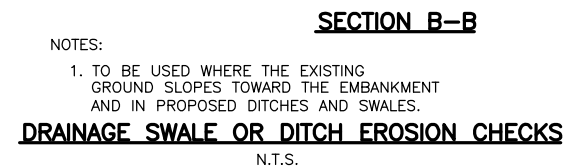
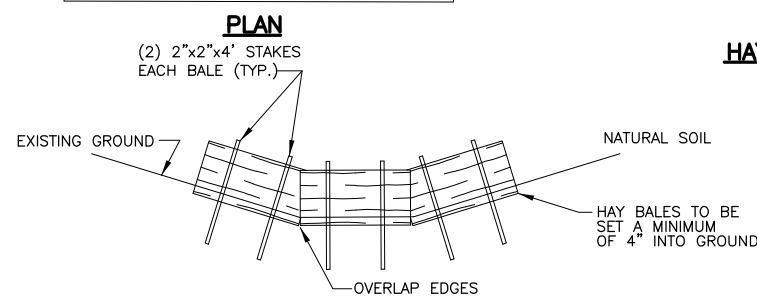
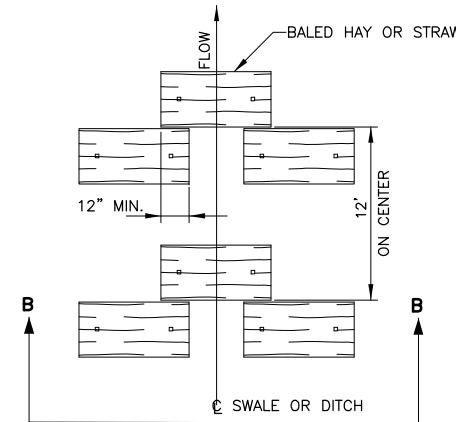
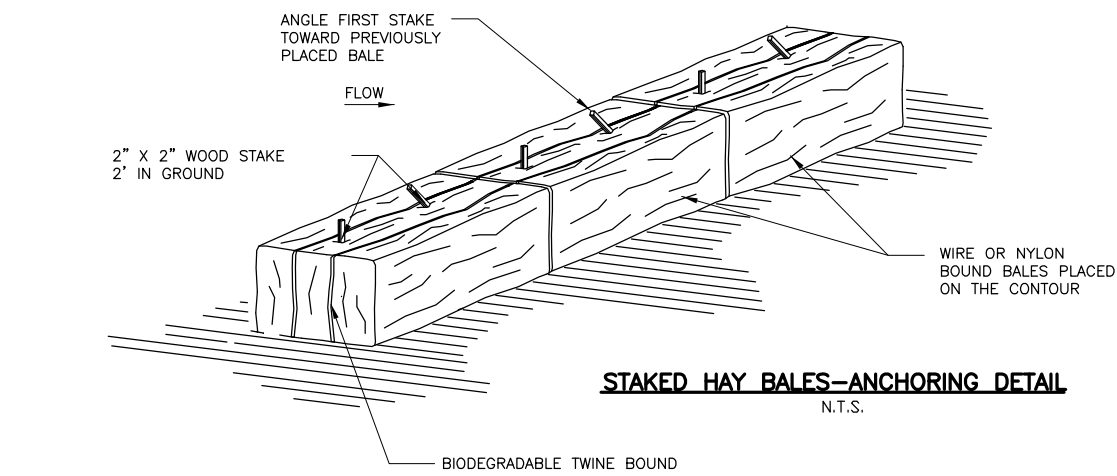
- ALL DISTURBED EARTH SLOPES SHALL BE STABILIZED WITH PERMANENT VEGETATIVE COVER AS SOON AS POSSIBLE. DISTURBED AREAS, THAT ARE NOT SUBJECT TO CONSTRUCTION TRAFFIC, SHALL RECEIVE A PERMANENT OR TEMPORARY VEGETATIVE COVER AS SOON AS FINAL CONTOURS ARE ESTABLISHED. IF THE SEASON PREVENTS THE ESTABLISHMENT OF A VEGETATIVE COVER, DISTURBED AREAS SHALL BE THOROUGHLY MULCHED. MULCHED AREAS SHALL BE SEEDED AS SOON AS WEATHER CONDITIONS ALLOW.
- ALL SLOPES STEEPER THAN 2H:1V SHALL BE COVERED WITH AN APPROVED EROSION CONTROL MATTING (SC150 BN BY NORTH AMERICAN GREEN OR APPROVED EQUAL). SEE SLOPE EROSION CONTROL DETAIL FOR SLOPES STEEPER THAN 2H:1V.
- A STOCKPILE OF EXTRA SILTATION FENCE AND CRUSHED STONE SHALL BE KEPT ON SITE THROUGHOUT THE CONSTRUCTION WORK. THIS MATERIAL SHALL BE INSTALLED AT THE DIRECTION OF THE ENGINEER TO MITIGATE ANY EROSION/SEDIMENTATION CONDITIONS WHICH MAY ARISE.
- FOR LOCATION OF PROPOSED EROSION CONTROL MEASURES, SEE PLANS. AREAS DISTURBED BY EROSION BARRIERS, SHALL BE LOAMED AND SEEDED, OR OTHERWISE RESTORED TO ORIGINAL CONDITIONS.
- CONTRACTOR SHALL REMOVE ALL SEDIMENTATION CONTROL SYSTEMS, REMOVE ALL ACCUMULATED SEDIMENTS, AND SEED THE DISTURBED AREAS, WHEN THE CONTROL SYSTEMS ARE NO LONGER REQUIRED. CONTRACTOR SHALL REQUEST AND RECEIVE PERMISSION FROM THE ENGINEER PRIOR TO REMOVING ANY CONTROL SYSTEM.

**CONSTRUCTION SPECIFICATIONS FOR STAKED HAY BALES**

BALES SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF 6". BALES SHALL BE SECURELY ANCHORED IN PLACE BY STAKES OR RE-BARS DRIVEN THROUGH THE BALES. THE FIRST STAKE IN EACH BALE SHALL BE ANGLED TOWARD PREVIOUSLY PLACED BALE TO FORCE THE BALES TOGETHER. INSPECTION SHALL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS DIRECTED BY THE ENGINEER. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

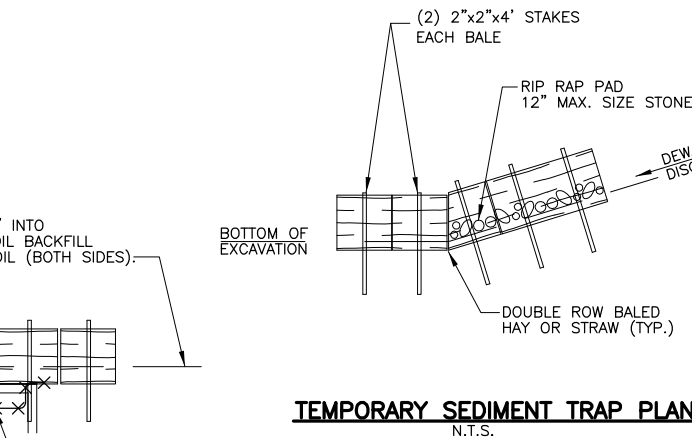
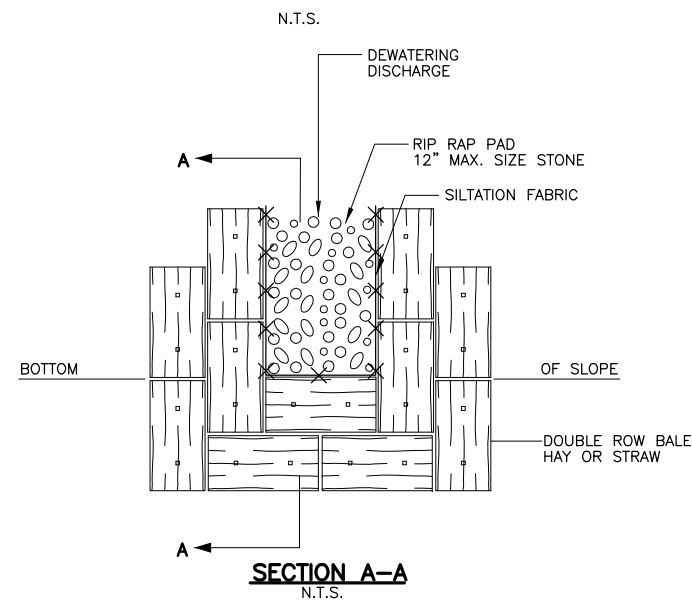
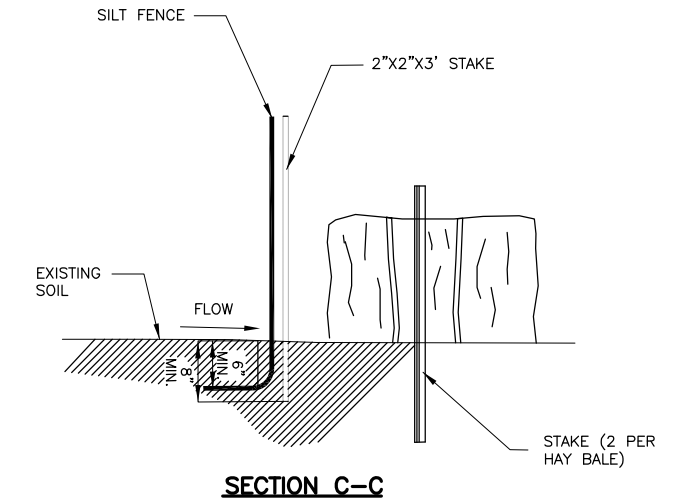
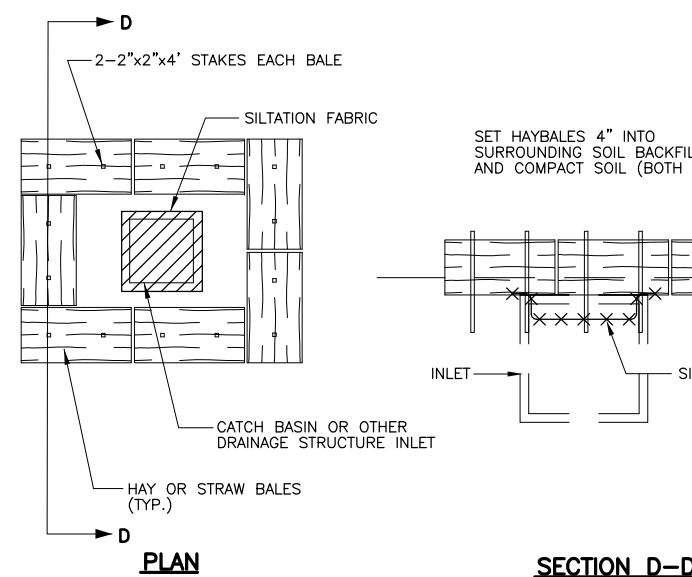
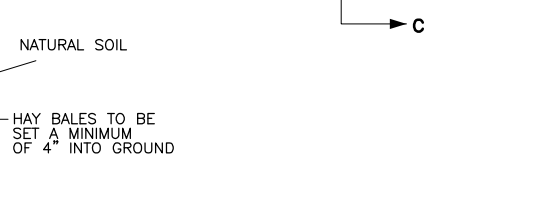
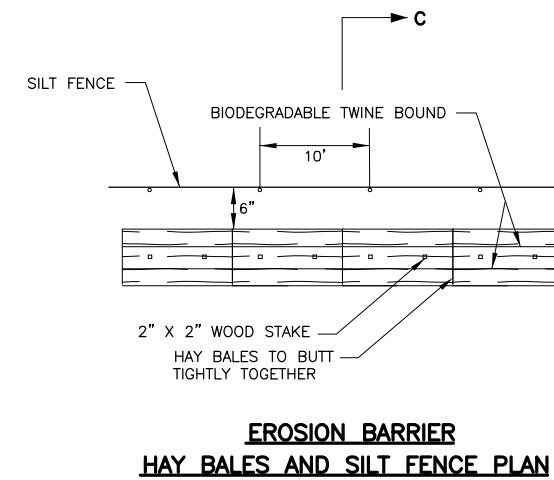
**CONSTRUCTION SPECIFICATIONS ON SILTATION & EROSION CONTROL**

- EROSION CONTROL MEASURES SHALL BE INCORPORATED IN THE SEQUENCE OF CONSTRUCTION TO PREVENT SEDIMENT LADEN WATER FROM LEAVING THE SITE.
- AREAS SUBJECT TO EROSION SHALL BE MINIMIZED IN TERMS OF TIME AND AREA.
- IN GENERAL, WORK REQUIRING EROSION CONTROL INCLUDES EXCAVATIONS, FILLS, DRAINAGE, SWALES AND DITCHES, ROUGH AND FINISH GRADING, AND STOCKPILING OF EARTH.
- DO NOT DISTURB VEGETATION AND TOPSOIL BEYOND THE PROPOSED LIMIT OF SILT FENCE ACTIVITIES.
- UPON COMPLETION OF ALL CATCH BASINS, HAY BALES WILL BE PLACED AROUND EACH STRUCTURE TO PREVENT SILTATION, IF DEEMED NECESSARY BY RESIDENT ENGINEER.
- THE CONTRACTOR SHALL REMOVE TEMPORARY SILT FENCE AND HAYBALE DIKES AND ALL ACCUMULATED SILT AND DEBRIS AFTER COMPLETION OF CONSTRUCTION OPERATIONS. HAYBALE DIKES SHALL BE IN PLACE AT ALL TIMES DURING CONSTRUCTION.
- THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL SILT AND DEBRIS RESULTING FROM CONSTRUCTION OPERATIONS FROM EACH DRAINAGE STRUCTURE UPON COMPLETION OF THE PROJECT.
- OBJECTS AND/OR AREAS DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED TO THEIR ORIGINAL CONDITION AND ELEVATION.
- THE CONTRACTOR SHALL REPLACE ANY SECTION OF HAY BALES OR SILT FENCES DAMAGED DURING ANY PHASE OF CONSTRUCTION.



**NOTES:**

- TO BE USED WHERE THE EXISTING GROUND SLOPES TOWARD THE EMBANKMENT AND IN PROPOSED DITCHES AND SWALES.



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: A. HEALEY  
 DRAWN BY: A. HEALEY  
 SHEET CHK'D BY: L. SHERMAN  
 CROSS CHK'D BY: C. LIGGETT  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

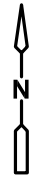
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**EROSION CONTROL DETAILS**

PROJECT NO. 0139-68660  
 FILE NAME: CSTE001

SHEET NO.  
**20**

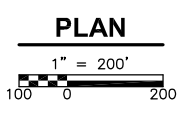
Accession No: 0139-P-xxxx



**NOTES:**

1. EXISTING WATER DISTRIBUTION SYSTEM PLANS ARE FOR CONTRACTOR'S CONVENIENCE ONLY FOR CONSTRUCTION PURPOSES. THE LOCATION AND SIZE OF EXISTING PIPES, VALVES, HYDRANTS AND SERVICE CONNECTIONS ARE NOT WARRANTED TO BE EXACT NOR IS IT WARRANTED THAT ALL EXISTING WATER SYSTEM FEATURES ARE SHOWN. CONTRACTOR SHALL CONTACT THE CAMBRIDGE WATER DEPARTMENT WITH QUESTIONS RELATED TO THE EXISTING WATER DISTRIBUTION SYSTEM.

FRESH POND



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. GALLANT  
 DRAWN BY: A. WELDON  
 SHEET CHK'D BY: J. DIERCKS  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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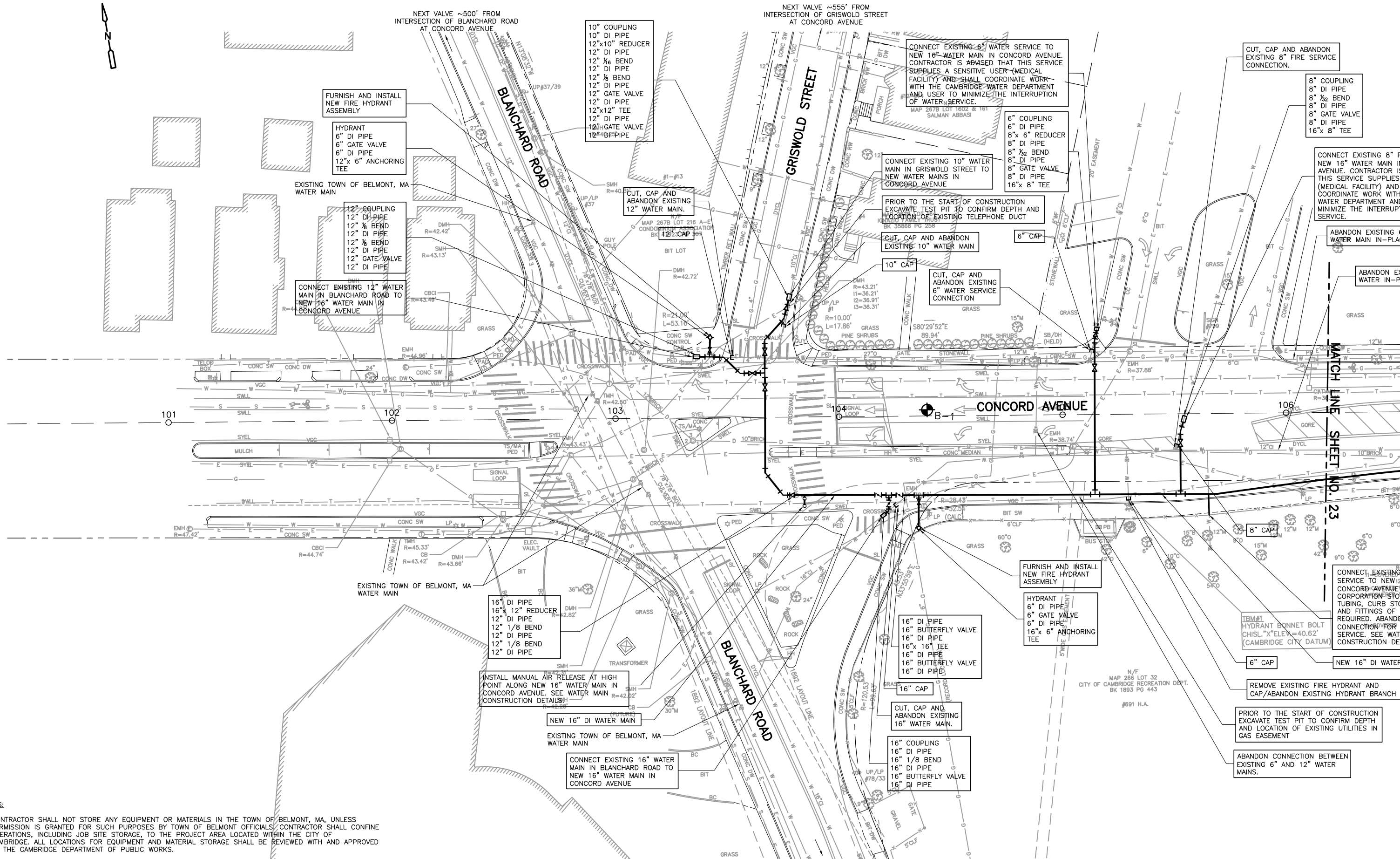
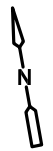
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**EXISTING WATER DISTRIBUTION SYSTEM  
 GENERAL PLAN**

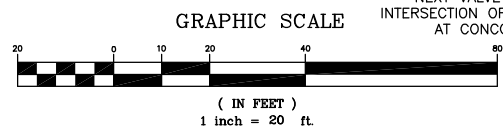
PROJECT NO. 0139-68660  
 FILE NAME: CSTW0001

SHEET NO.  
**21**

Accession No: 0139-P-xxxx



- NOTES:**
- CONTRACTOR SHALL NOT STORE ANY EQUIPMENT OR MATERIALS IN THE TOWN OF BELMONT, MA, UNLESS PERMISSION IS GRANTED FOR SUCH PURPOSES BY TOWN OF BELMONT OFFICIALS. CONTRACTOR SHALL CONFIN OPERATIONS, INCLUDING JOB SITE STORAGE, TO THE PROJECT AREA LOCATED WITHIN THE CITY OF CAMBRIDGE. ALL LOCATIONS FOR EQUIPMENT AND MATERIAL STORAGE SHALL BE REVIEWED WITH AND APPROVED BY THE CAMBRIDGE DEPARTMENT OF PUBLIC WORKS.
  - CONTRACTOR SHALL NOT USE HYDRANTS OR OTHERWISE USE WATER FOR CONSTRUCTION PURPOSES FROM THE BELMONT WATER SYSTEM.



DESIGNED BY: M. GALLANT	CDM
DRAWN BY: J. CABRERA	56 Exchange Terrace Providence, RI 02903 Tel: (401) 751-5360
SHEET CHK'D BY: J. DIERCKS	consulting • engineering • construction • operations
CROSS CHK'D BY: L. SHERMAN	
APPROVED BY: L. SHERMAN	
DATE: JANUARY 2010	

REV. NO.	DATE	DRWN	CHKD	REMARKS

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DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

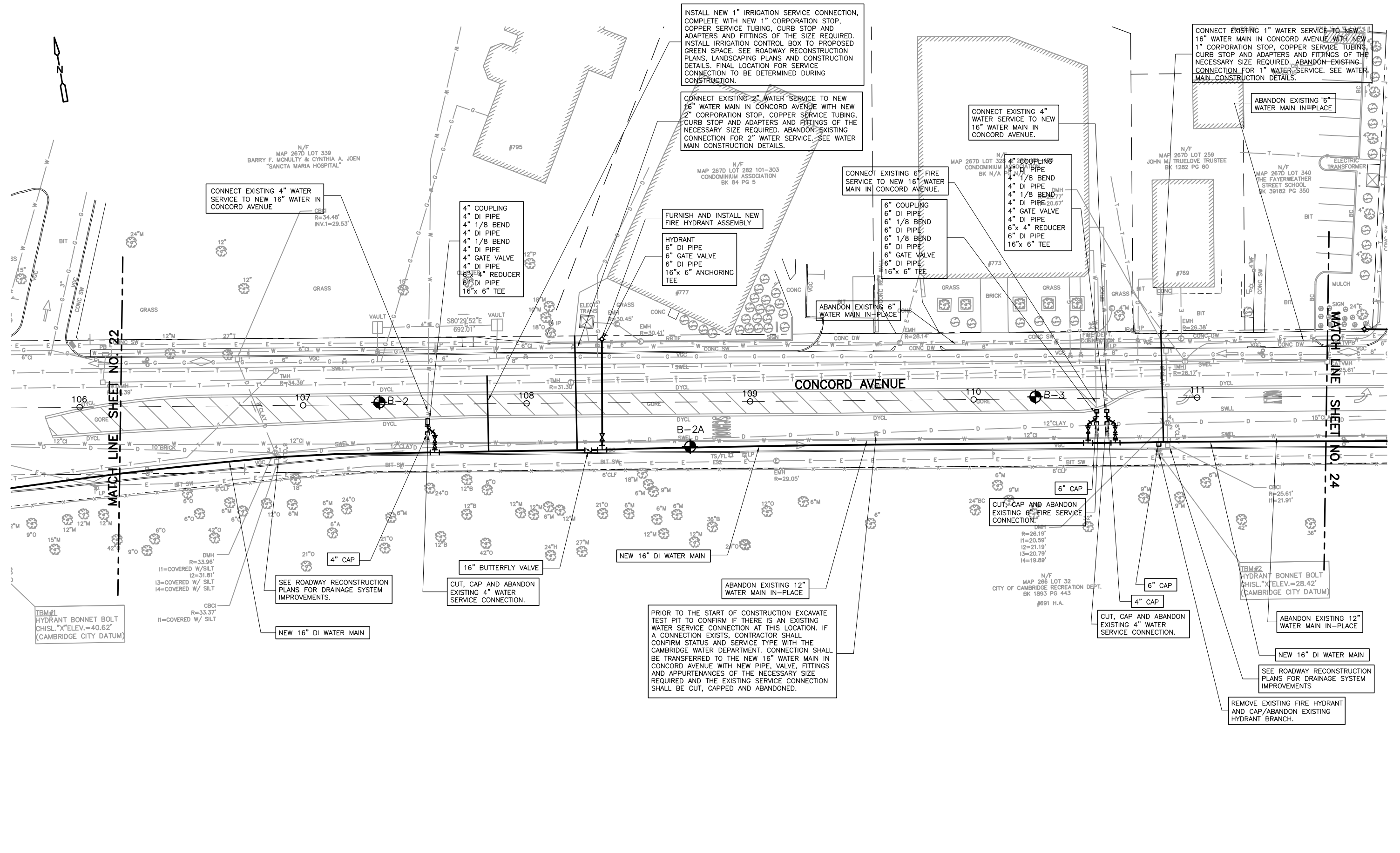
**CONCORD AVENUE  
WATER MAIN AND ROADWAY RECONSTRUCTION**

**WATER MAIN CONSTRUCTION PLAN**

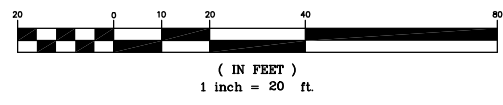
PROJECT NO. 0139-68660  
FILE NAME: CSTWP001

SHEET NO.  
**22**

Accession No: 0139-P-xxxx



GRAPHIC SCALE



REV. NO.	DATE	DRWN	CHKD	REMARKS

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 DRAWN BY: J. CABRERA  
 SHEET CHK'D BY: J. DIERCKS  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
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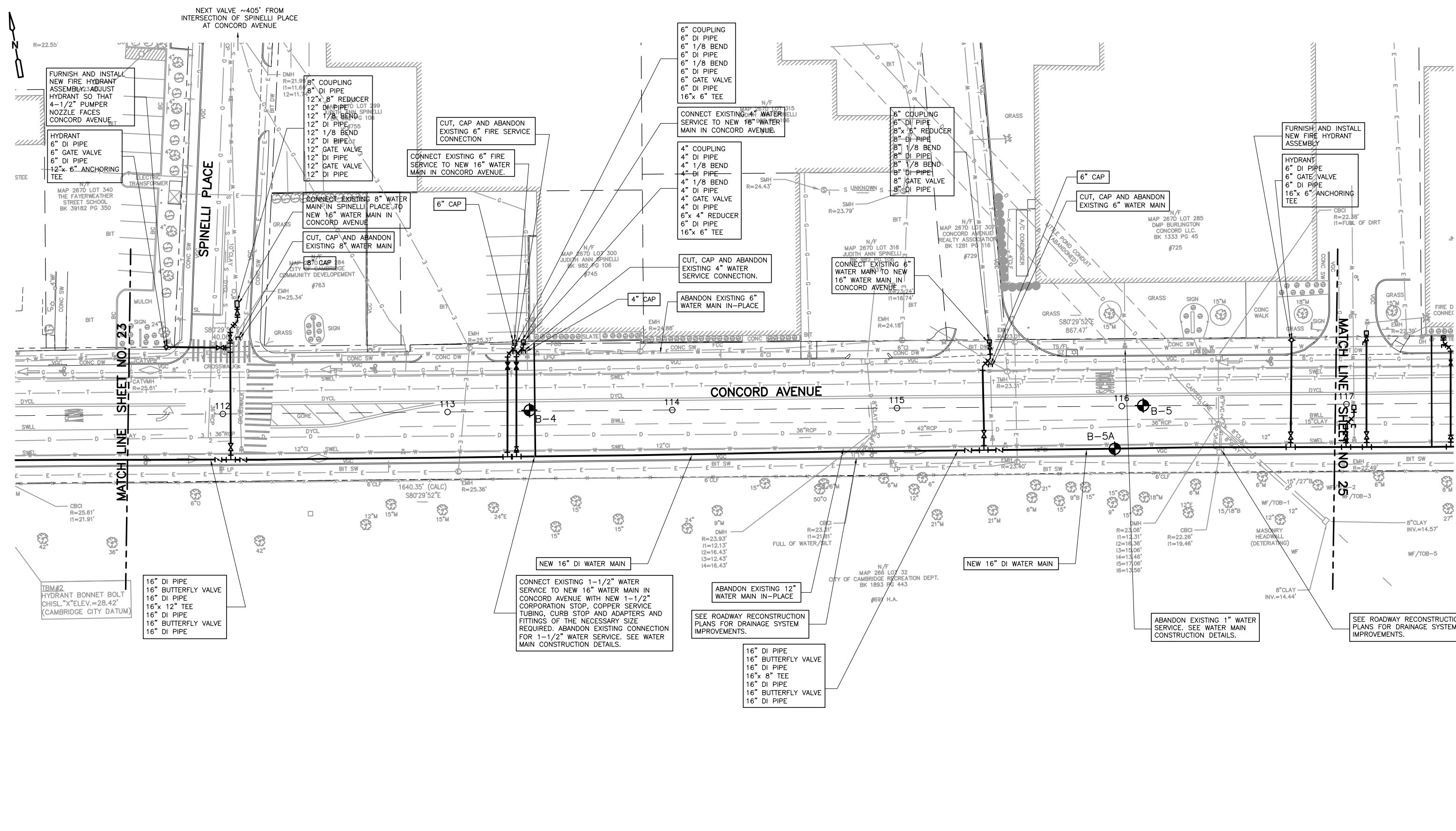
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 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

### CONCORD AVENUE WATER MAIN AND ROADWAY RECONSTRUCTION

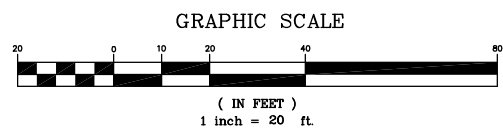
### WATER MAIN CONSTRUCTION PLAN





**NOTES:**

1. CONTRACTOR SHALL EXCAVATE TEST PIT TO LOCATE EXISTING WATER MAINS BEHIND #725 CONCORD AVENUE AT THE DIRECTION OF THE CAMBRIDGE WATER DEPARTMENT. THIS TEST PIT EXCAVATION HAS BEEN INCLUDED FOR PAYMENT AS PART OF THE RESPECTIVE BID ITEM FOR TEST PITS FOR WATER SYSTEM CONSTRUCTION.



REV. NO.	DATE	DRWN	CHKD	REMARKS

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 DRAWN BY: J. CABRERA  
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 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
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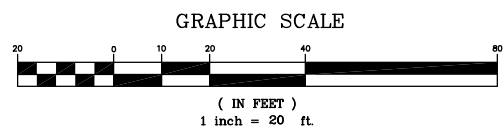
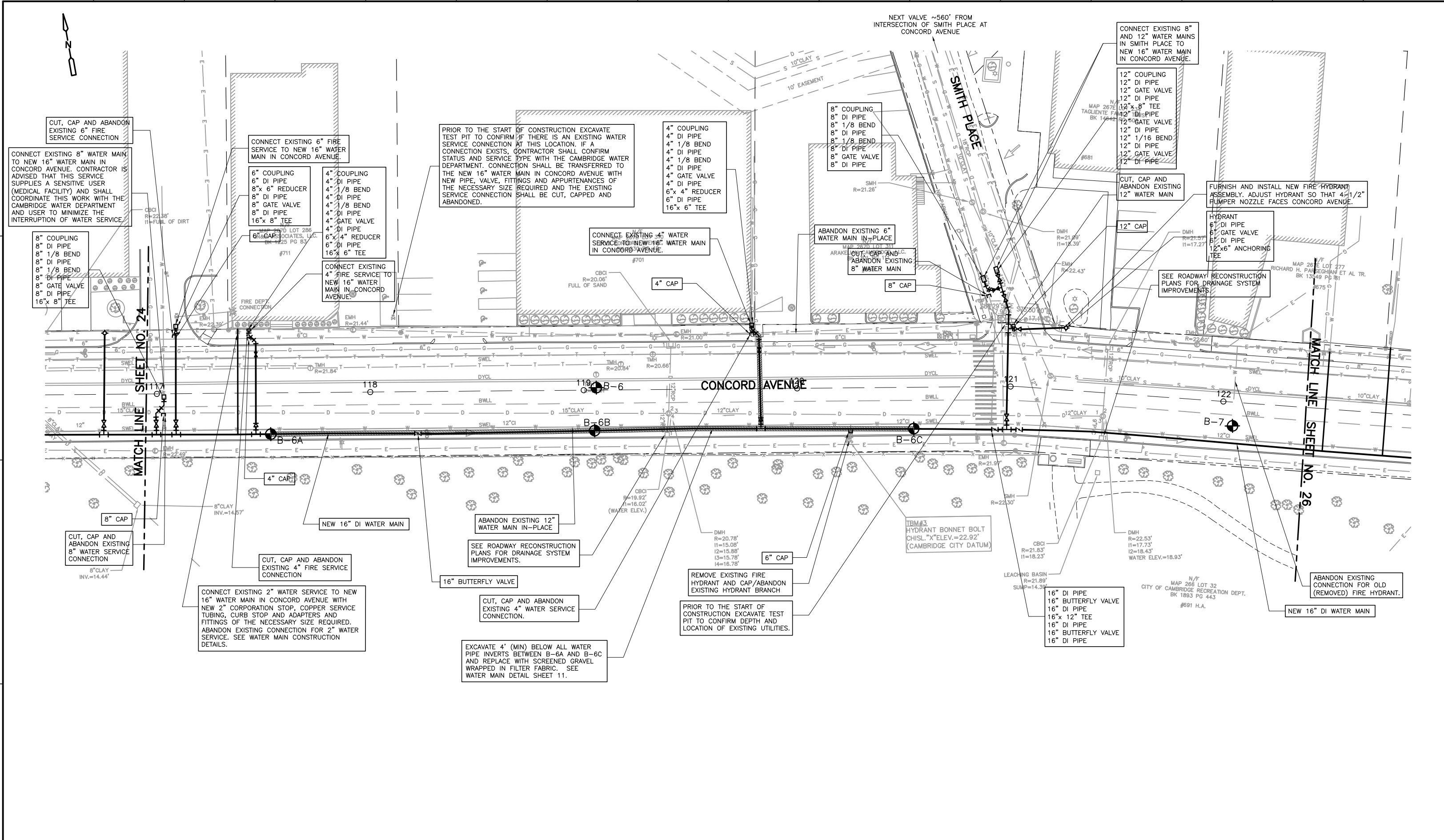
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**WATER MAIN CONSTRUCTION PLAN**

PROJECT NO. 0139-68660  
 FILE NAME: CSTWP001

SHEET NO.  
**24**

Accession No: 0139-P-xxxx



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. GALLANT  
 DRAWN BY: J. CABRERA  
 SHEET CHK'D BY: J. DIERCKX  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

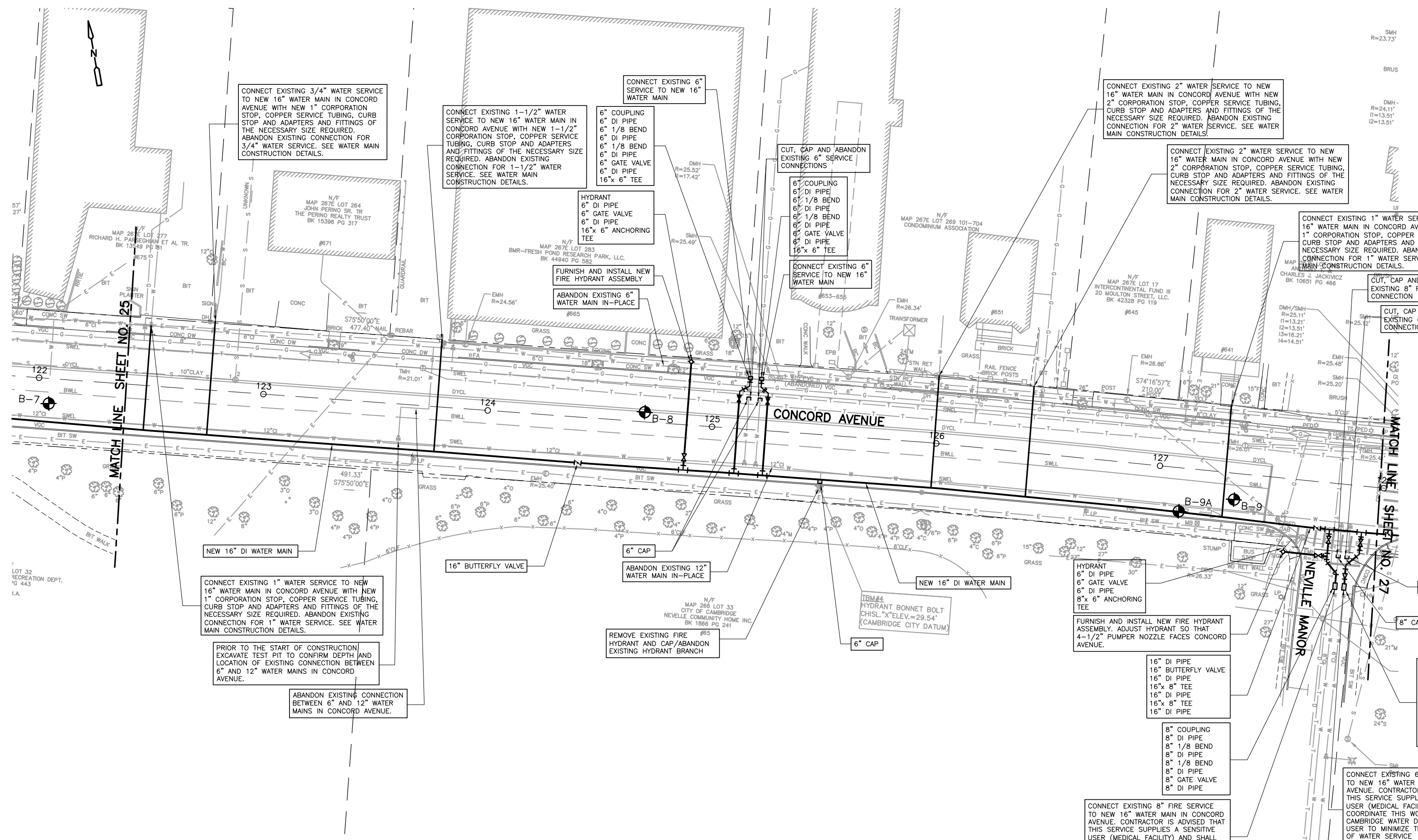
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 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

## CONCORD AVENUE WATER MAIN AND ROADWAY RECONSTRUCTION

## WATER MAIN CONSTRUCTION PLAN

PROJECT NO. 0139-68660  
 FILE NAME: CSTWP001  
 SHEET NO. **25**  
 Accession No: 0139-P-xxxx



GRAPHIC SCALE



REV. NO.	DATE	DRWN	CHKD	REMARKS

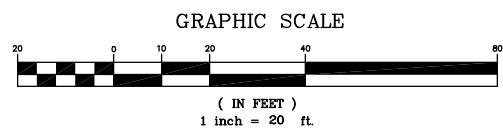
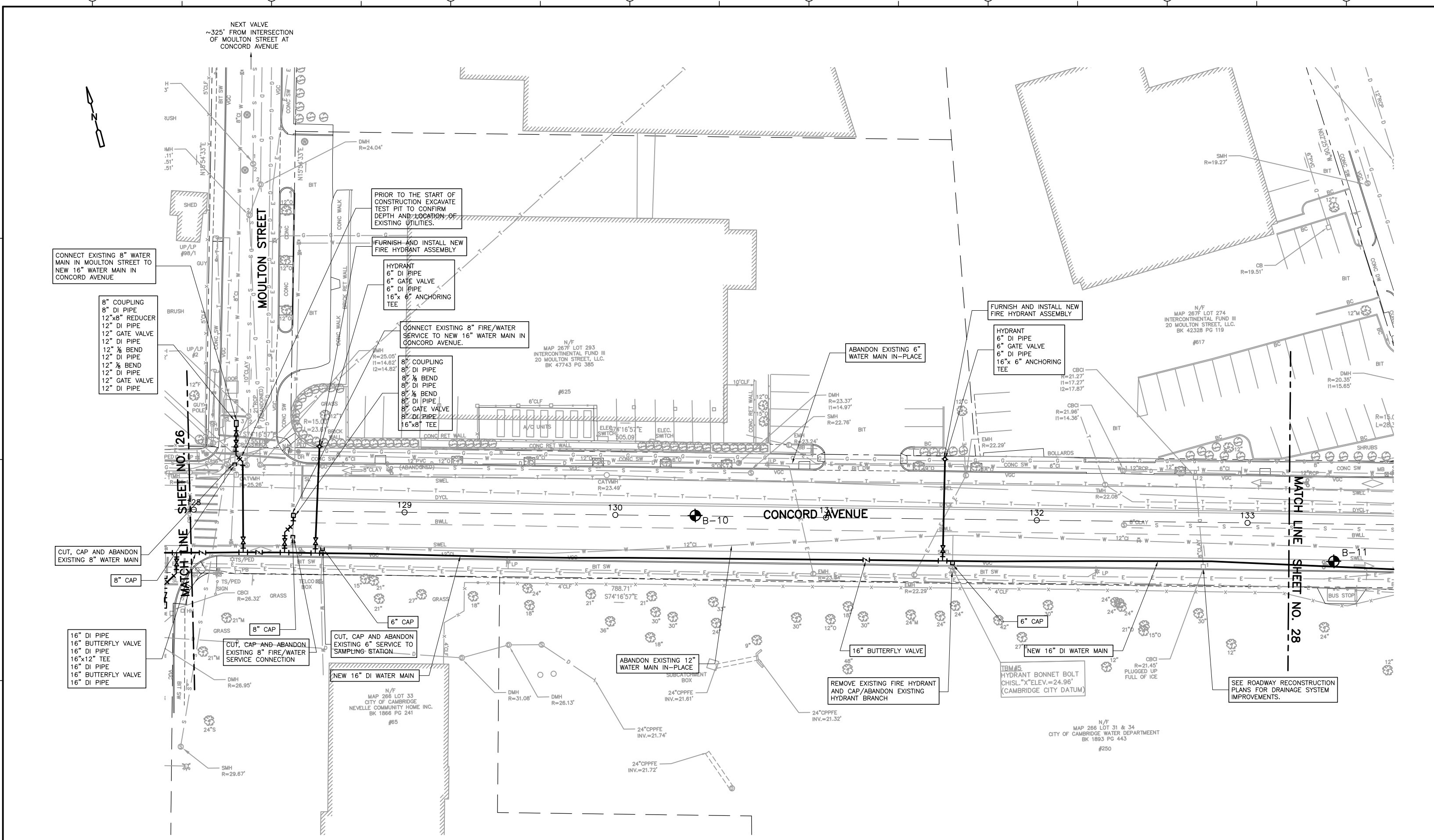
DESIGNED BY: M. GALLANT  
 DRAWN BY: J. CABRERA  
 SHEET CHK'D BY: J. DIERCKX  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT  
**CONCORD AVENUE**  
**WATER MAIN AND ROADWAY RECONSTRUCTION**

**WATER MAIN CONSTRUCTION PLAN**

PROJECT NO. 0139-68660  
 FILE NAME: CSTWP001  
 SHEET NO. **26**  
 Accession No: 0139-P-xxxx



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. GALLANT  
 DRAWN BY: J. CABRERA  
 SHEET CHK'D BY: J. DIERCKX  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

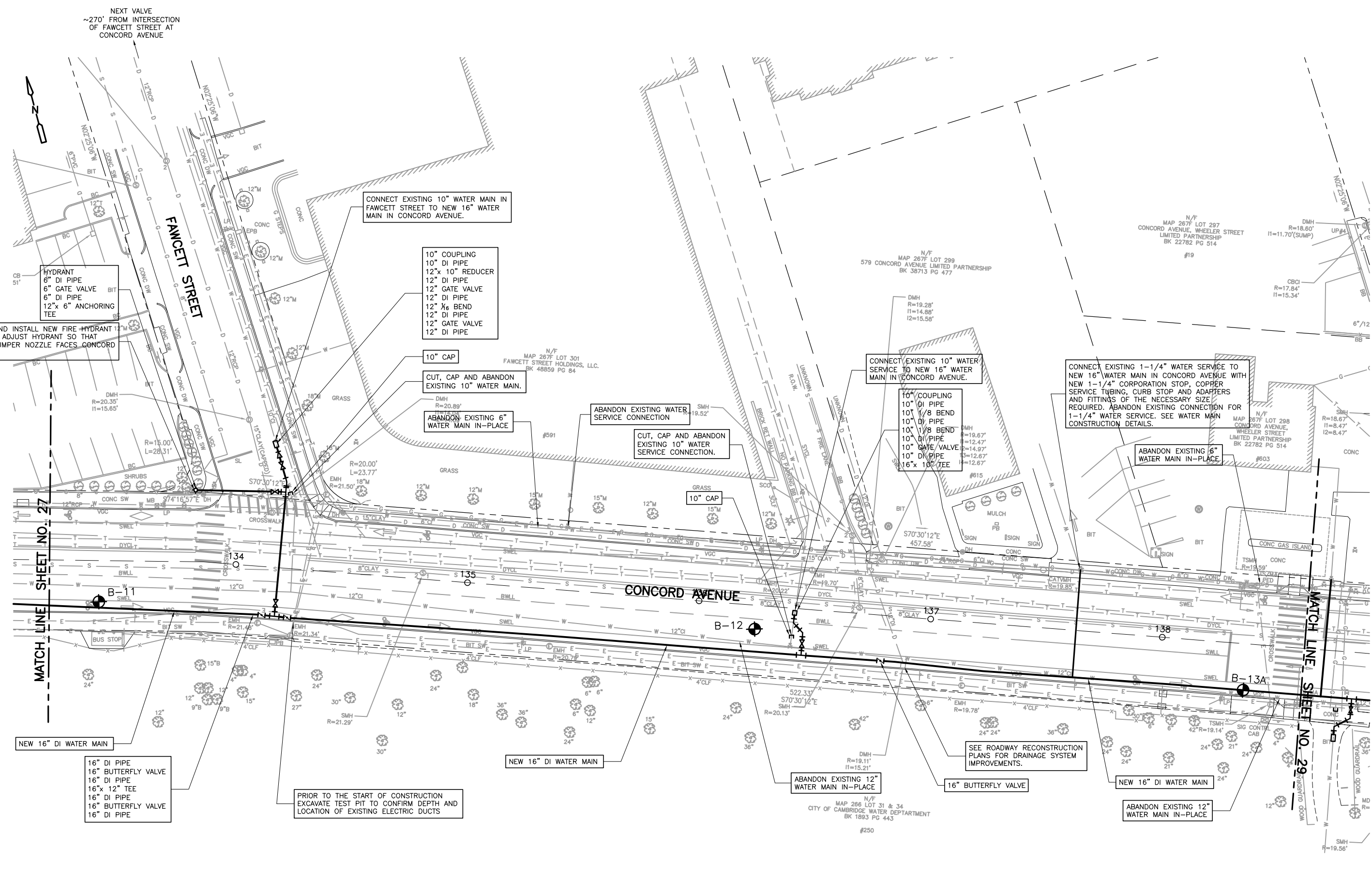
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**WATER MAIN CONSTRUCTION PLAN**

PROJECT NO. 0139-68660  
 FILE NAME: CSTWP001

SHEET NO.  
**27**

Accession No: 0139-P-xxxx



NEXT VALVE  
~270' FROM INTERSECTION  
OF FAWCETT STREET AT  
CONCORD AVENUE

CONNECT EXISTING 10" WATER MAIN IN  
FAWCETT STREET TO NEW 16" WATER  
MAIN IN CONCORD AVENUE.

10" COUPLING  
10" DI PIPE  
12"x 10" REDUCER  
12" DI PIPE  
12" GATE VALVE  
12" DI PIPE  
12" 1/8 BEND  
12" DI PIPE  
12" GATE VALVE  
12" DI PIPE

10" CAP  
CUT, CAP AND ABANDON  
EXISTING 10" WATER MAIN.

ABANDON EXISTING 6"  
WATER MAIN IN-PLACE

ABANDON EXISTING WATER  
SERVICE CONNECTION  
CUT, CAP AND ABANDON  
EXISTING 10" WATER  
SERVICE CONNECTION.

CONNECT EXISTING 10" WATER  
SERVICE TO NEW 16" WATER  
MAIN IN CONCORD AVENUE.

10" COUPLING  
10" DI PIPE  
10" 1/8 BEND  
10" DI PIPE  
10" 1/8 BEND  
10" DI PIPE  
10" GATE VALVE  
10" DI PIPE  
16" x 10" TEE

CONNECT EXISTING 1-1/4" WATER SERVICE TO  
NEW 16" WATER MAIN IN CONCORD AVENUE WITH  
NEW 1-1/4" CORPORATION STOP, COPPER  
SERVICE TUBING, CURB STOP AND ADAPTERS  
AND FITTINGS OF THE NECESSARY SIZE  
REQUIRED. ABANDON EXISTING CONNECTION FOR  
1-1/4" WATER SERVICE. SEE WATER MAIN  
CONSTRUCTION DETAILS.

ABANDON EXISTING 6"  
WATER MAIN IN-PLACE

HYDRANT  
8" DI PIPE  
6" GATE VALVE  
6" DI PIPE  
12"x 6" ANCHORING  
TEE

FURNISH AND INSTALL NEW FIRE HYDRANT  
ASSEMBLY. ADJUST HYDRANT SO THAT  
4-1/2" PUMPER NOZZLE FACES CONCORD  
AVENUE.

MATCH LINE SHEET NO. 27

MATCH LINE SHEET NO. 29

NEW 16" DI WATER MAIN  
16" DI PIPE  
16" BUTTERFLY VALVE  
16" DI PIPE  
16"x 12" TEE  
16" DI PIPE  
16" BUTTERFLY VALVE  
16" DI PIPE

PRIOR TO THE START OF CONSTRUCTION  
EXCAVATE TEST PIT TO CONFIRM DEPTH AND  
LOCATION OF EXISTING ELECTRIC DUCTS

NEW 16" DI WATER MAIN

ABANDON EXISTING 12"  
WATER MAIN IN-PLACE

16" BUTTERFLY VALVE

NEW 16" DI WATER MAIN  
ABANDON EXISTING 12"  
WATER MAIN IN-PLACE

GRAPHIC SCALE



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. GALLANT  
DRAWN BY: J. CABRERA  
SHEET CHK'D BY: J. DIERCKS  
CROSS CHK'D BY: L. SHERMAN  
APPROVED BY: L. SHERMAN  
DATE: JANUARY 2010

**CDM**  
56 Exchange Terrace  
Providence, RI 02903  
Tel: (401) 751-5360  
consulting • engineering • construction • operations

CITY OF CAMBRIDGE, MASSACHUSETTS  
DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

**CONCORD AVENUE  
WATER MAIN AND ROADWAY RECONSTRUCTION**

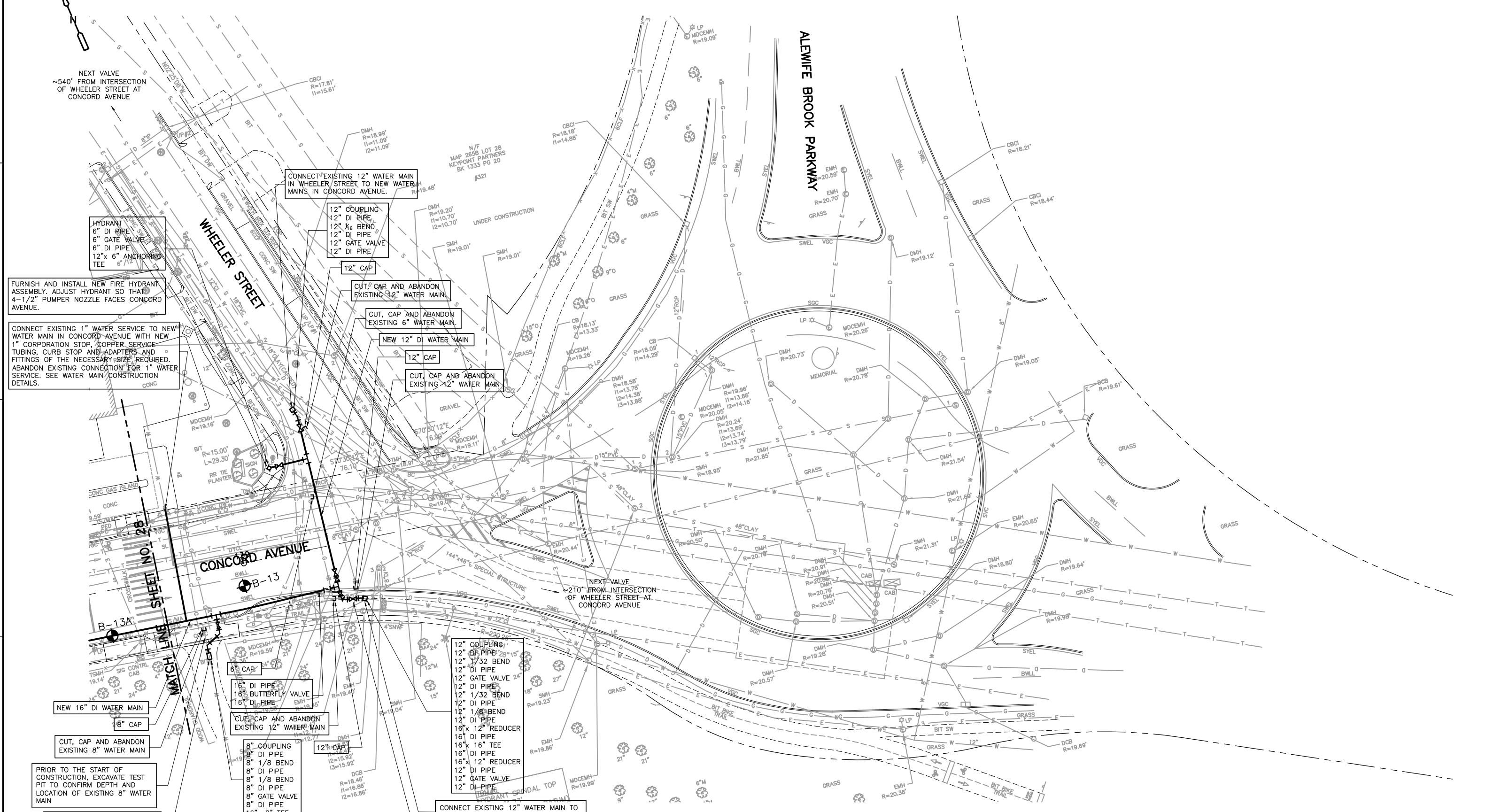
**WATER MAIN CONSTRUCTION PLAN**

PROJECT NO. 0139-68660  
FILE NAME: CSTWP001

SHEET NO.  
**28**

Accession No: 0139-P-xxxx

NEXT VALVE  
~540' FROM INTERSECTION  
OF WHEELER STREET AT  
CONCORD AVENUE



HYDRANT  
6" DI PIPE  
6" GATE VALVE  
6" DI PIPE  
12" x 6" ANCHORING  
TEE

FURNISH AND INSTALL NEW FIRE HYDRANT  
ASSEMBLY. ADJUST HYDRANT SO THAT  
4-1/2" PUMPER NOZZLE FACES CONCORD  
AVENUE.

CONNECT EXISTING 1" WATER SERVICE TO NEW  
WATER MAIN IN CONCORD AVENUE WITH NEW  
1" CORPORATION STOP, COPPER SERVICE  
TUBING, CURB STOP AND ADAPTERS AND  
FITTINGS OF THE NECESSARY SIZE REQUIRED.  
ABANDON EXISTING CONNECTION FOR 1" WATER  
SERVICE. SEE WATER MAIN CONSTRUCTION  
DETAILS.

CONNECT EXISTING 12" WATER MAIN  
IN WHEELER STREET TO NEW WATER  
MAINS IN CONCORD AVENUE.

12" COUPLING  
12" DI PIPE  
12" 1/8 BEND  
12" DI PIPE  
12" GATE VALVE  
12" DI PIPE

12" CAP

CUT, CAP AND ABANDON  
EXISTING 12" WATER MAIN.

CUT, CAP AND ABANDON  
EXISTING 6" WATER MAIN.

NEW 12" DI WATER MAIN

12" CAP

CUT, CAP AND ABANDON  
EXISTING 12" WATER MAIN.

B-13

6" CAP

16" DI PIPE  
16" BUTTERFLY VALVE  
16" DI PIPE

CUT, CAP AND ABANDON  
EXISTING 12" WATER MAIN

8" COUPLING  
8" DI PIPE  
8" 1/8 BEND  
8" DI PIPE  
8" 1/8 BEND  
8" DI PIPE  
8" GATE VALVE  
8" DI PIPE

16" x 8" TEE

12" CAP

12" COUPLING  
12" DI PIPE  
12" 1/32 BEND  
12" DI PIPE  
12" GATE VALVE 24"

12" DI PIPE  
12" 1/32 BEND  
12" DI PIPE  
12" 1/8 BEND  
12" DI PIPE

16" x 12" REDUCER  
16" DI PIPE  
16" x 16" TEE  
16" DI PIPE  
16" x 12" REDUCER  
12" DI PIPE  
12" GATE VALVE  
12" DI PIPE

12" CAP

CONNECT EXISTING 12" WATER MAIN TO  
NEW WATER MAINS IN CONCORD AVENUE.

PRIOR TO THE START OF CONSTRUCTION  
EXCAVATE TEST PITS TO CONFIRM DEPTH  
AND LOCATION OF EXISTING UTILITIES.

GRAPHIC SCALE



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: M. GALLANT  
DRAWN BY: J. CABRERA  
SHEET CHK'D BY: J. DIERCKS  
CROSS CHK'D BY: L. SHERMAN  
APPROVED BY: L. SHERMAN  
DATE: JANUARY 2010

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DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

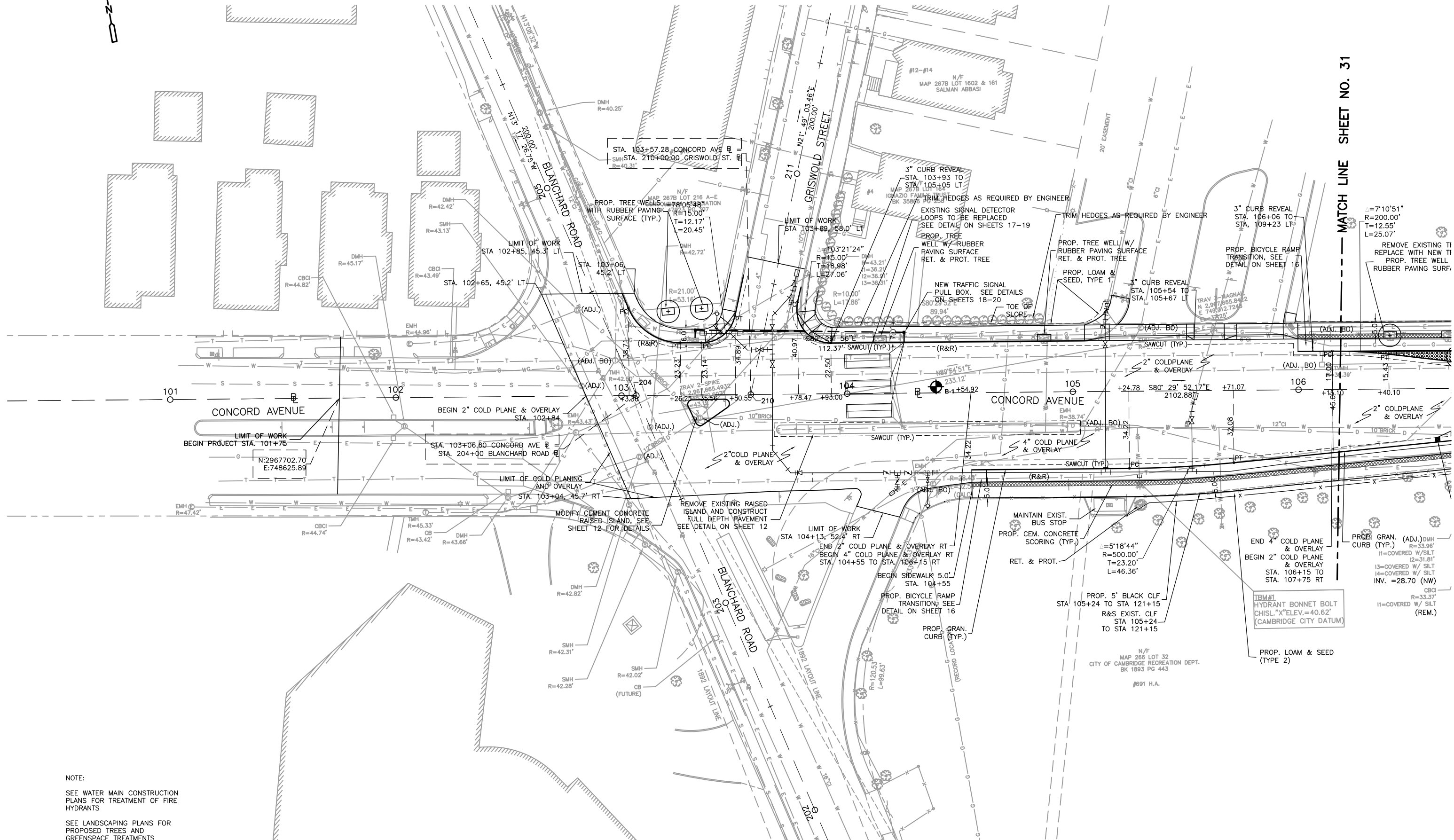
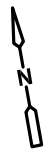
**CONCORD AVENUE  
WATER MAIN AND ROADWAY RECONSTRUCTION**

**WATER MAIN CONSTRUCTION PLAN**

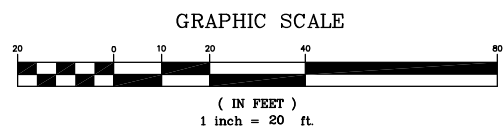
PROJECT NO. 0139-68660  
FILE NAME: CSTWP001

SHEET NO.  
**29**

Accession No: 0139-P-xxxx



NOTE:  
SEE WATER MAIN CONSTRUCTION PLANS FOR TREATMENT OF FIRE HYDRANTS  
SEE LANDSCAPING PLANS FOR PROPOSED TREES AND GREENSPACE TREATMENTS



MATCH LINE SHEET NO. 31

=7'10"51"  
R=200.00'  
T=12.55'  
L=25.07'  
REMOVE EXISTING TI  
REPLACE WITH NEW TI  
PROP. TREE WELL  
RUBBER PAVING SURF.

PROB. GRAN. (ADJ.) DMH  
CURB (TYP.)  
R=33.96'  
11=COVERED W/ SILT  
12=31.81'  
13=COVERED W/ SILT  
14=COVERED W/ SILT  
INV. =28.70 (NW)  
CSCI  
R=33.37'  
11=COVERED W/ SILT  
(REM.)

REV. NO.	DATE	DRWN	CHKD	REMARKS

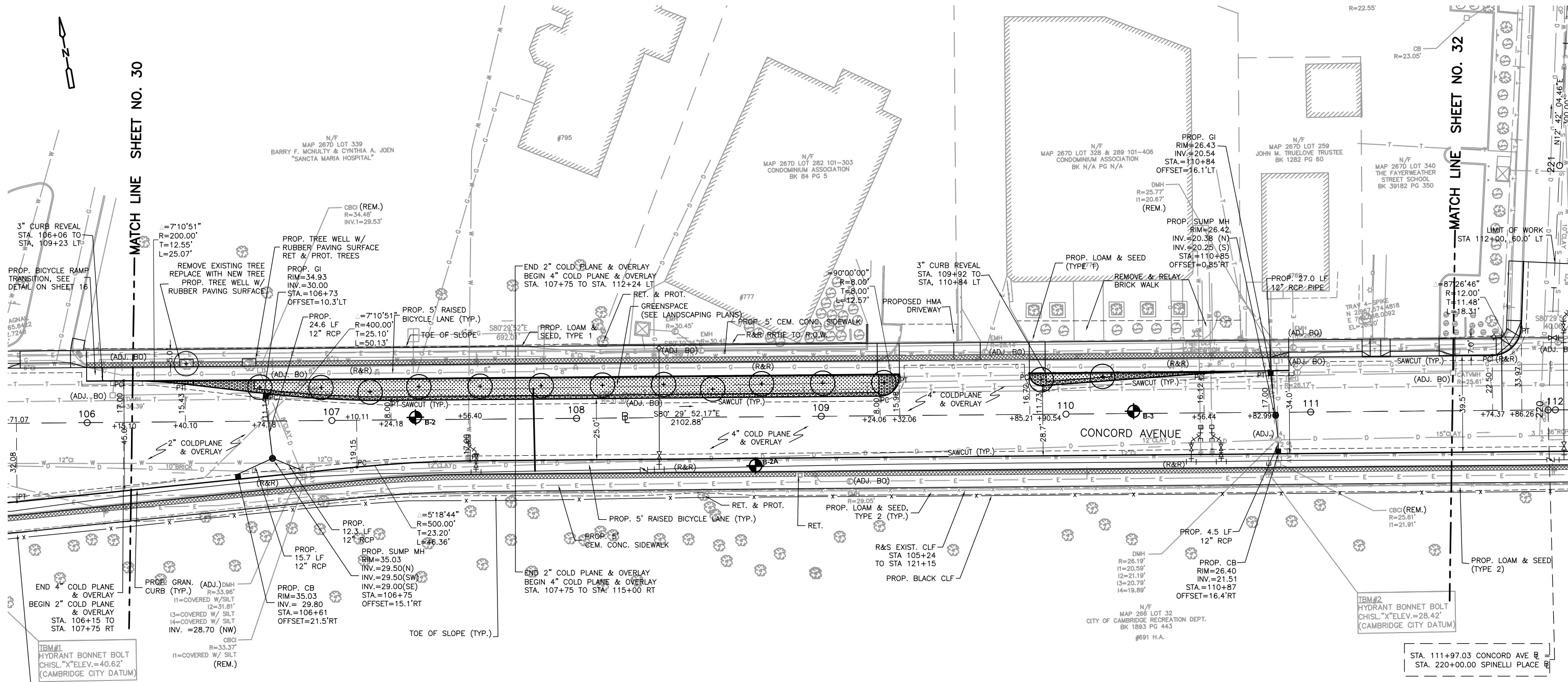
DESIGNED BY: S. MURPHY  
DRAWN BY: S. MURPHY  
SHEET CHK'D BY: C. LIGGETT  
CROSS CHK'D BY: L. SHERMAN  
APPROVED BY: L. SHERMAN  
DATE: JANUARY 2010

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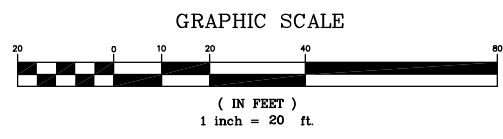
CITY OF CAMBRIDGE, MASSACHUSETTS  
DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT  
**CONCORD AVENUE  
WATER MAIN AND ROADWAY RECONSTRUCTION**

**ROADWAY CONSTRUCTION PLANS**

PROJECT NO. 0139-68660  
FILE NAME: CSTCP001  
SHEET NO. **30**  
Accession No: 0139-P-xxxx



NOTE:  
SEE WATER MAIN CONSTRUCTION  
PLANS FOR TREATMENT OF FIRE  
HYDRANTS



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. MURPHY  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

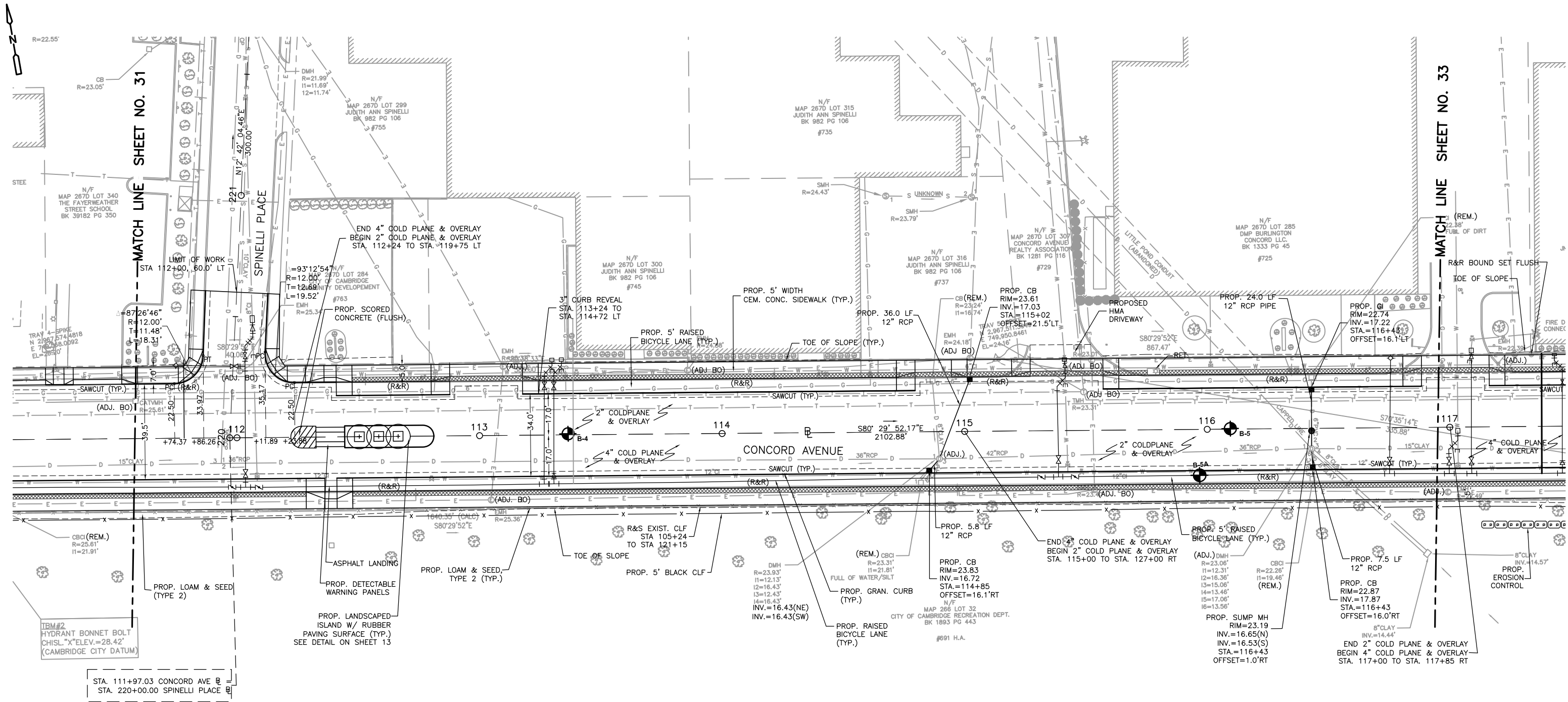
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 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

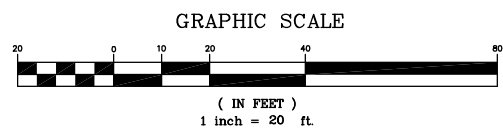
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**ROADWAY CONSTRUCTION PLANS**





NOTE:  
SEE WATER MAIN CONSTRUCTION  
PLANS FOR TREATMENT OF FIRE  
HYDRANTS



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. MURPHY  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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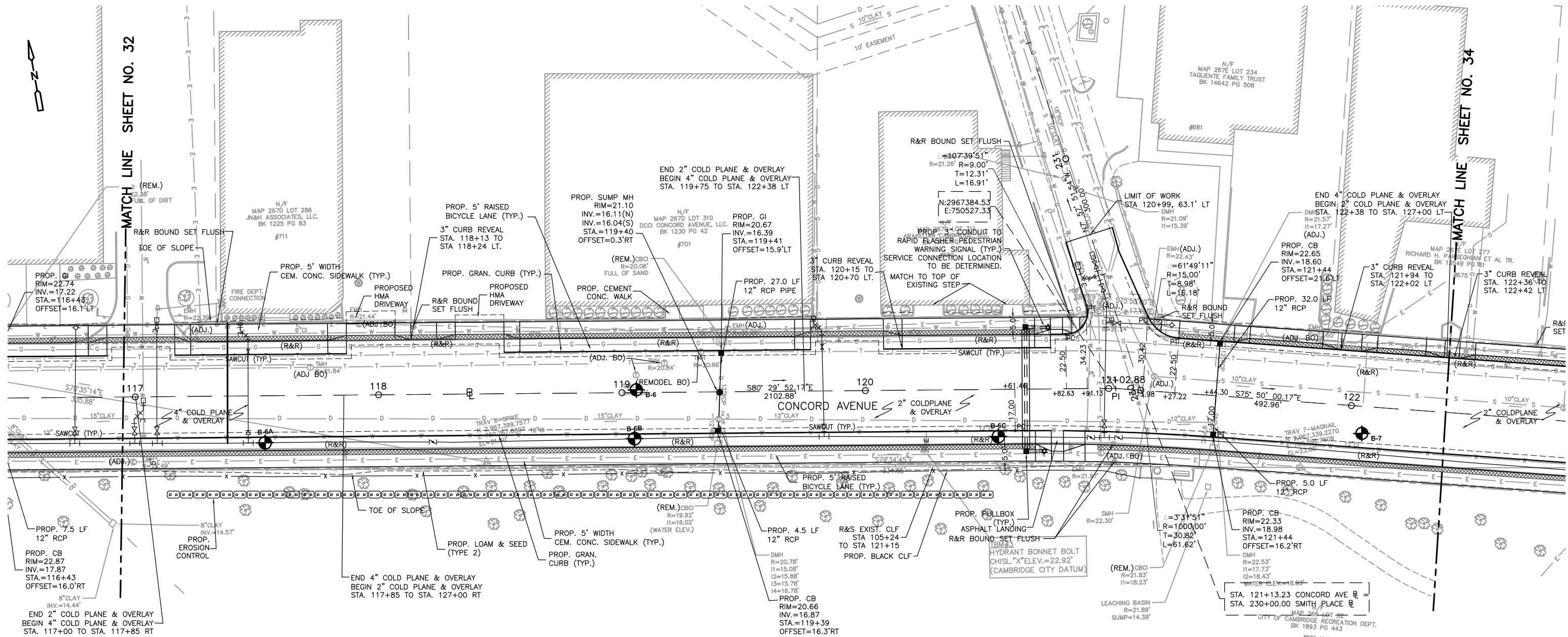
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**ROADWAY CONSTRUCTION PLANS**

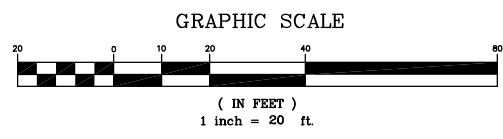
PROJECT NO. 0139-68660  
 FILE NAME: CSTCP001

SHEET NO.  
**32**

Accession No: 0139-P-xxxx



NOTE:  
SEE WATER MAIN CONSTRUCTION  
PLANS FOR TREATMENT OF FIRE  
HYDRANTS



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. MURPHY  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

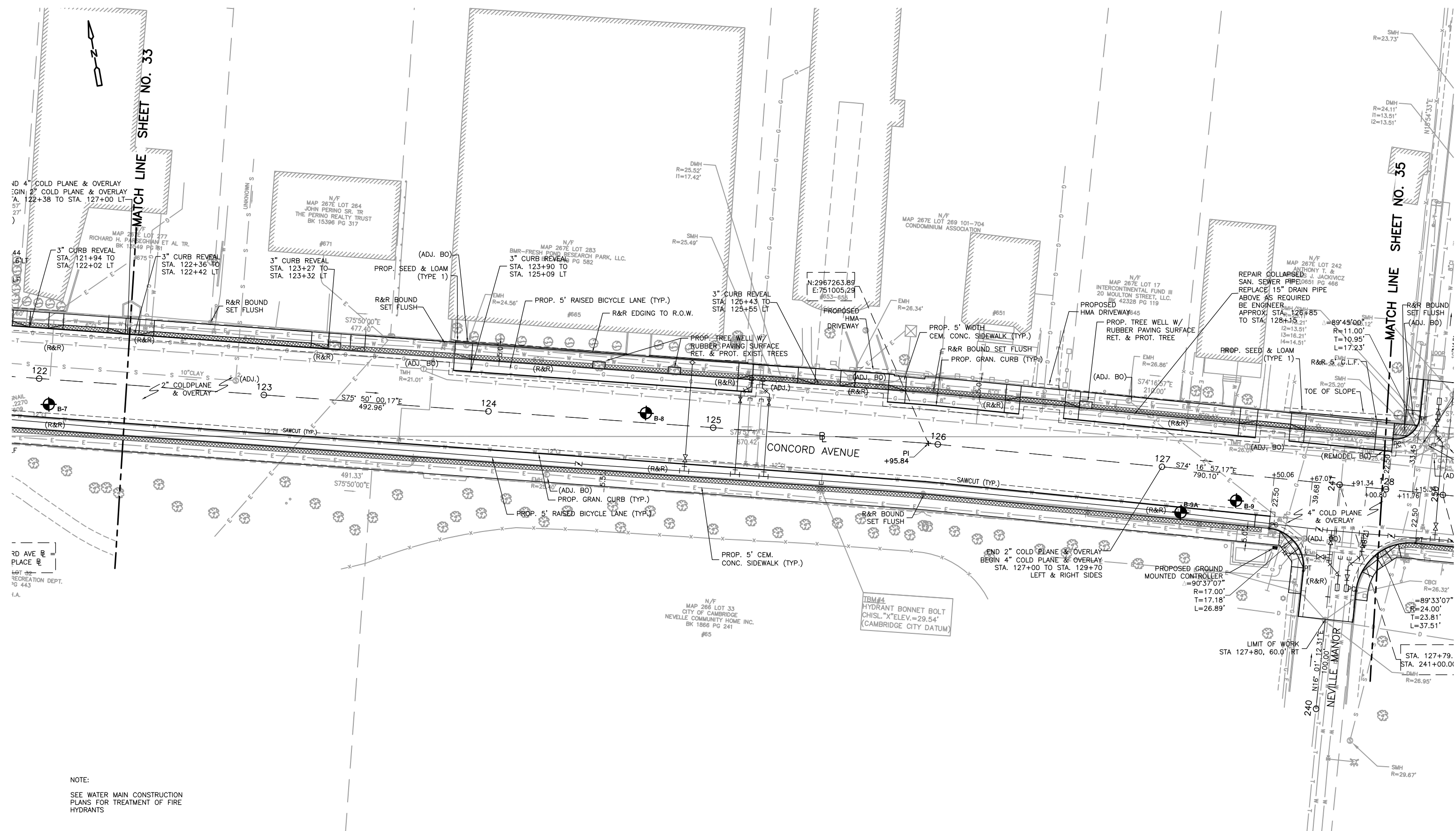
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 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

## CONCORD AVENUE WATER MAIN AND ROADWAY RECONSTRUCTION

**ROADWAY CONSTRUCTION PLANS**

PROJECT NO.	0139-68660
FILE NAME:	CSTCPO01
SHEET NO.	<b>33</b>
Accession No.	0139-P-xxxx



122  
123  
124  
125  
126  
127

RD AVE PLACE  
LOT 32  
RECREATION DEPT.  
PG 443  
I.A.

NOTE:  
SEE WATER MAIN CONSTRUCTION  
PLANS FOR TREATMENT OF FIRE  
HYDRANTS

GRAPHIC SCALE



REV. NO.	DATE	DRWN	CHKD	REMARKS

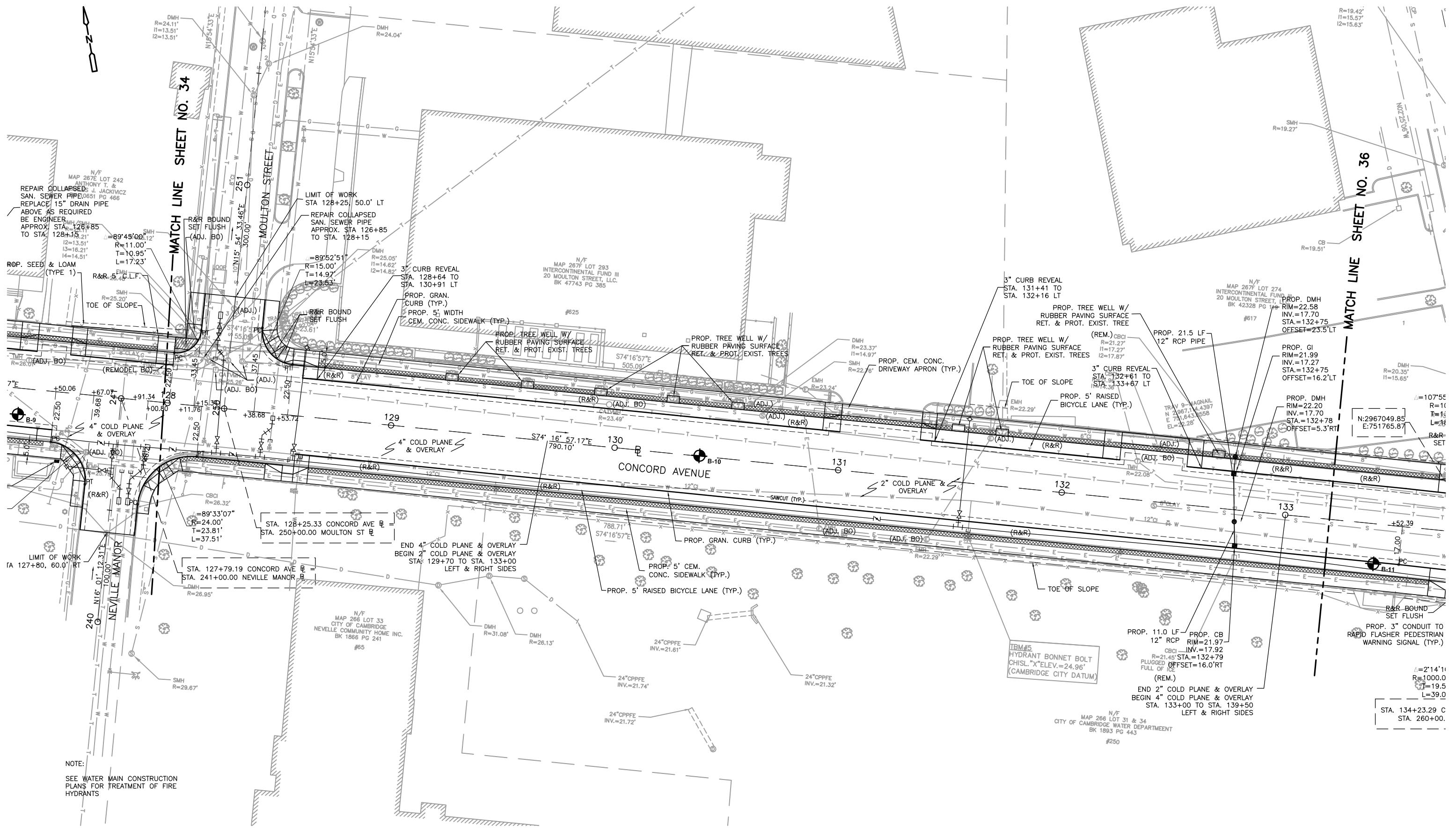
DESIGNED BY: S. MURPHY  
DRAWN BY: S. MURPHY  
SHEET CHK'D BY: C. LIGGETT  
CROSS CHK'D BY: L. SHERMAN  
APPROVED BY: L. SHERMAN  
DATE: JANUARY 2010

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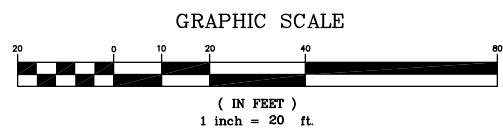
CITY OF CAMBRIDGE, MASSACHUSETTS  
DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT  
**CONCORD AVENUE  
WATER MAIN AND ROADWAY RECONSTRUCTION**

**ROADWAY CONSTRUCTION PLANS**

PROJECT NO. 0139-68660  
FILE NAME: CSTCP001  
SHEET NO.  
**34**  
Accession No: 0139-P-xxxx



NOTE:  
SEE WATER MAIN CONSTRUCTION  
PLANS FOR TREATMENT OF FIRE  
HYDRANTS



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. MURPHY  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

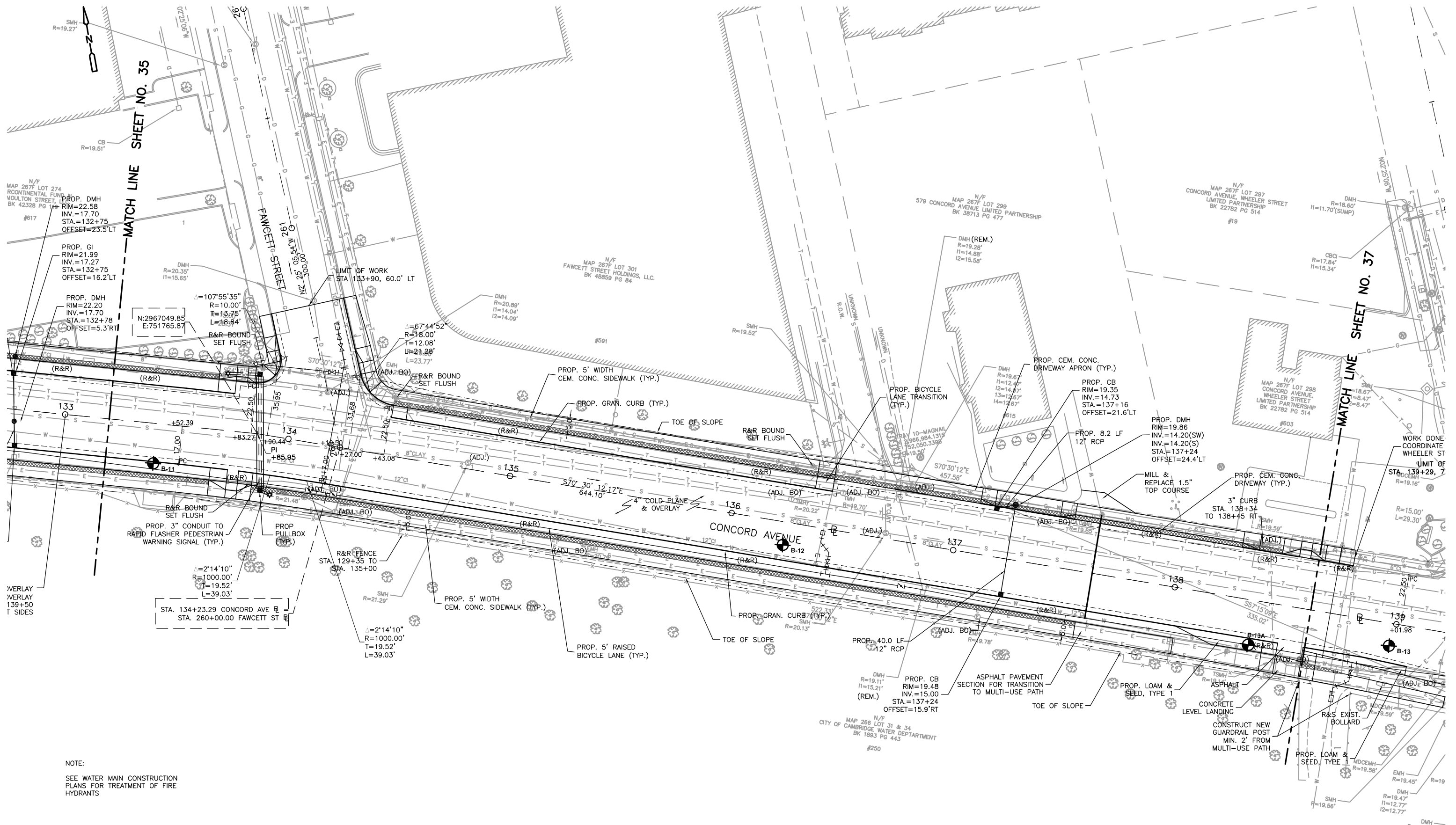
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**ROADWAY CONSTRUCTION PLANS**

PROJECT NO. 0139-68660  
 FILE NAME: CSTCP001

SHEET NO.  
**35**

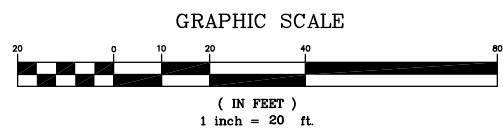
Accession No: 0139-P-xxxx



MATCH LINE SHEET NO. 35

MATCH LINE SHEET NO. 37

NOTE:  
SEE WATER MAIN CONSTRUCTION  
PLANS FOR TREATMENT OF FIRE  
HYDRANTS



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. MURPHY  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

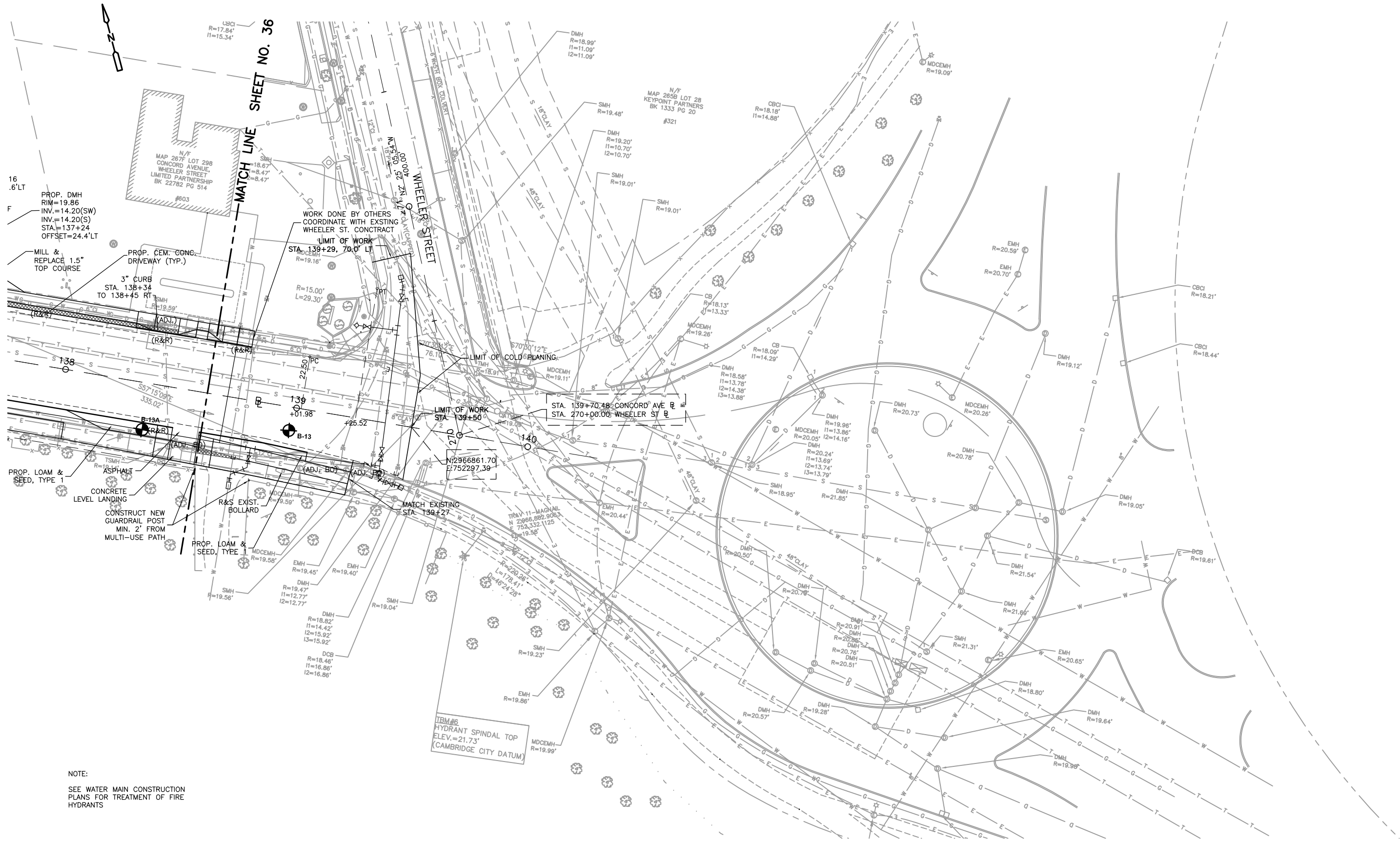
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**ROADWAY CONSTRUCTION PLANS**

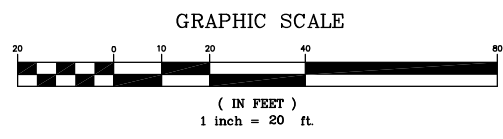
PROJECT NO. 0139-68660  
 FILE NAME: CSTCP001

SHEET NO.  
**36**

Accession No: 0139-P-xxxx



NOTE:  
SEE WATER MAIN CONSTRUCTION  
PLANS FOR TREATMENT OF FIRE  
HYDRANTS



REV. NO.	DATE	DRWN	CHKD	REMARKS

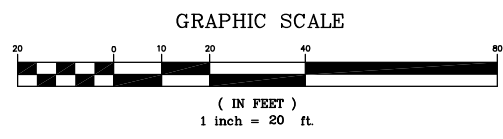
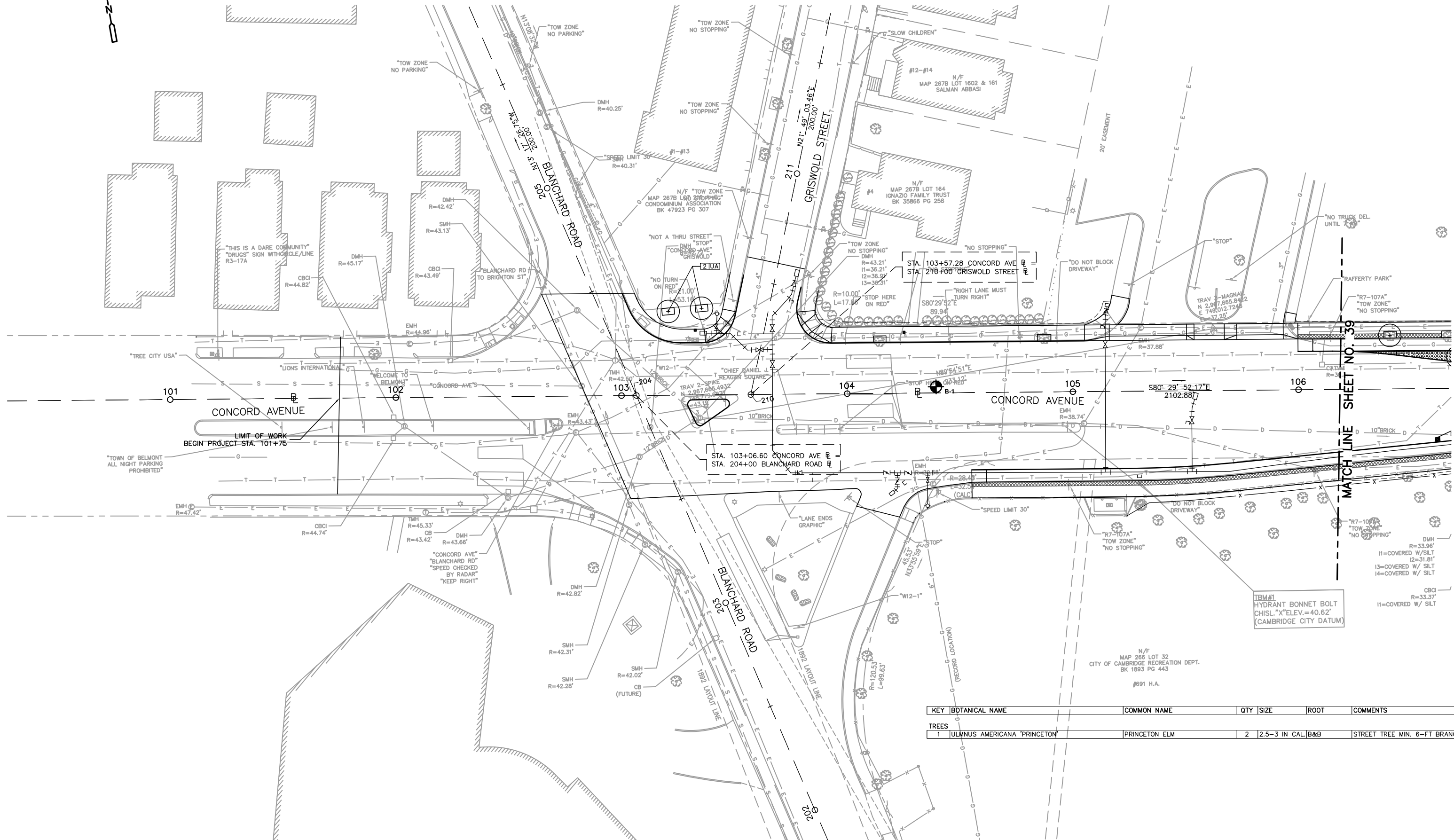
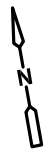
DESIGNED BY: S. MURPHY  
DRAWN BY: S. MURPHY  
SHEET CHK'D BY: C. LIGGETT  
CROSS CHK'D BY: L. SHERMAN  
APPROVED BY: L. SHERMAN  
DATE: JANUARY 2010

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DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT  
**CONCORD AVENUE  
WATER MAIN AND ROADWAY RECONSTRUCTION**

**ROADWAY CONSTRUCTION PLANS**

PROJECT NO. 0139-68660  
FILE NAME: CSTCP001  
SHEET NO.  
**37**  
Accession No: 0139-P-xxxx



KEY	BOTANICAL NAME	COMMON NAME	QTY	SIZE	ROOT	COMMENTS
TREES						
1	ULMUS AMERICANA 'PRINCETON'	PRINCETON ELM	2	2.5-3 IN CAL.	B&B	STREET TREE MIN. 6-FT BRANCH HT.

TRM#1  
HYDRANT BONNET BOLT  
CHISL. "X" ELEV. = 40.62'  
(CAMBRIDGE CITY DATUM)

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: H. DAVIS  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

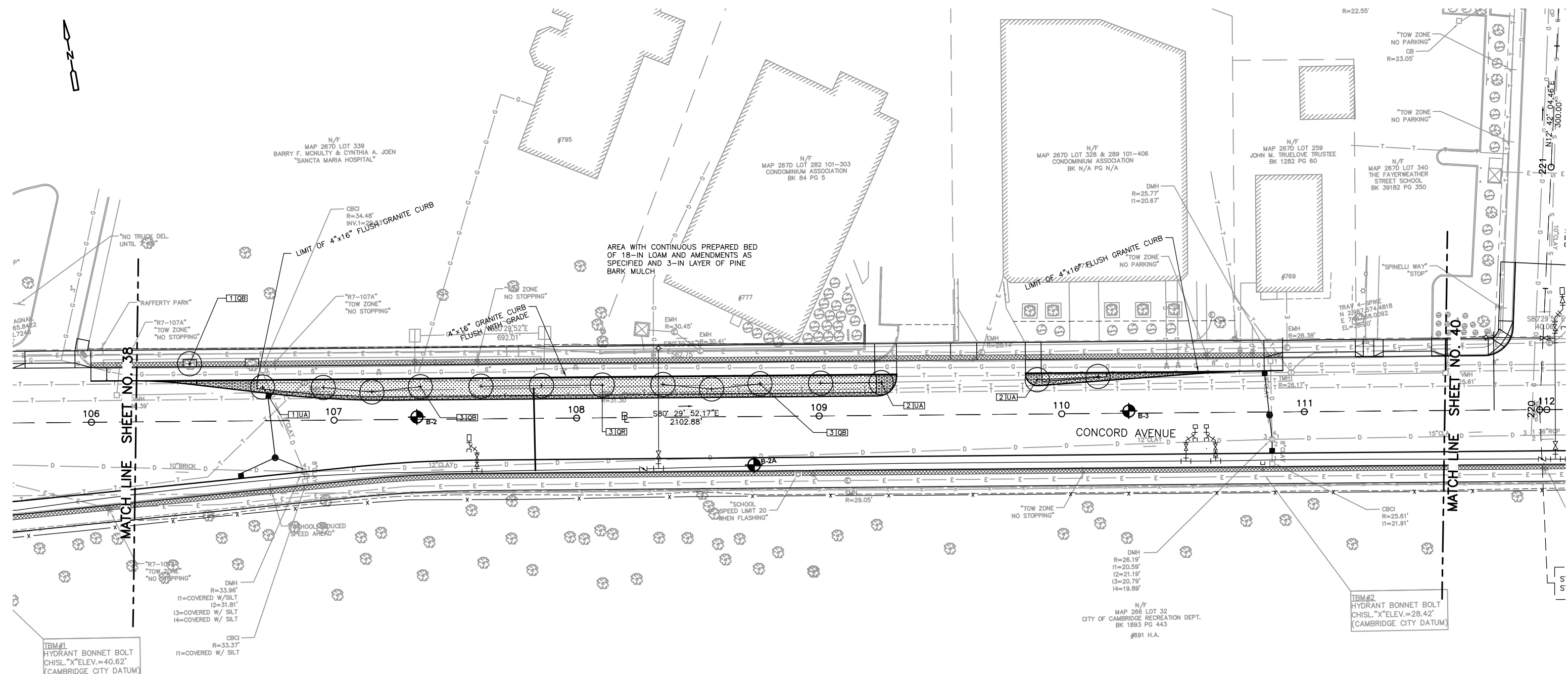
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**LANDSCAPING PLANS**

PROJECT NO. 0139-68660  
 FILE NAME: CSTLP001

SHEET NO.  
**38**

Accession No: 0139-P-xxxx

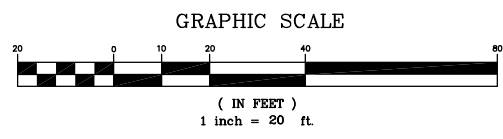


KEY	BOTANICAL NAME	COMMON NAME	QTY	SIZE	ROOT	COMMENTS
<b>TREES</b>						
1	QUERCUS BICOLOR	WHITE SWAMP OAK	7	2.5-3 IN CAL.	B&B	STREET TREE MIN. 6-FT BRANCH HT.
2	QUERCUS RUBRA	RED OAK	3	2.5-3 IN CAL.	B&B	STREET TREE MIN. 6-FT BRANCH HT.
3	ULMUS AMERICANA 'PRINCETON'	PRINCETON ELM	5	2.5-3 IN CAL.	B&B	STREET TREE MIN. 6-FT BRANCH HT.
<b>ORNAMENTAL GRASSES</b>						
1	HELICTOTRICHON SEMPERVIRENS 'SAPHIRSPRUDEL'	SAPPHIRE SATIN BLUE OAT GRASS	228	1 GAL. CONT.		
2	PENNISETUM ALOPERCUROIDES 'HAMELN'	DWARF FOUNTAIN GRASS	228	1 GAL. CONT.		
<b>PERENNIALS</b>						
1	NARCISSUS 'KING ALFRED'	TRUMPET DAFFODIL	152	BULB, DOUBLE		
2	HEMEROCALLIS 'STELLA SUPREME'	DAYLILLY STELLA SUPREME	152	1 GAL. CONT.		

ORNAMENTAL GRASSES SPACED 24-IN OC TO BE PLACED IN NATURAL DRIFTS AS POSITIONED IN FIELD BY LANDSCAPE ARCHITECT

DAYLILIES PLACED 18-IN OC IN NATURAL DRIFTS AS POSITIONED IN FIELD BY LANDSCAPE ARCHITECT. DAFFODILS 6-IN OC IN NATURAL DRIFTS

NOTE: "LEAKY PIPE" IRRIGATION SYSTEM TO BE PROVIDED AND INSTALLED BY CONTRACTOR WITH APPROVAL BY DPW.



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: H. DAVIS  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

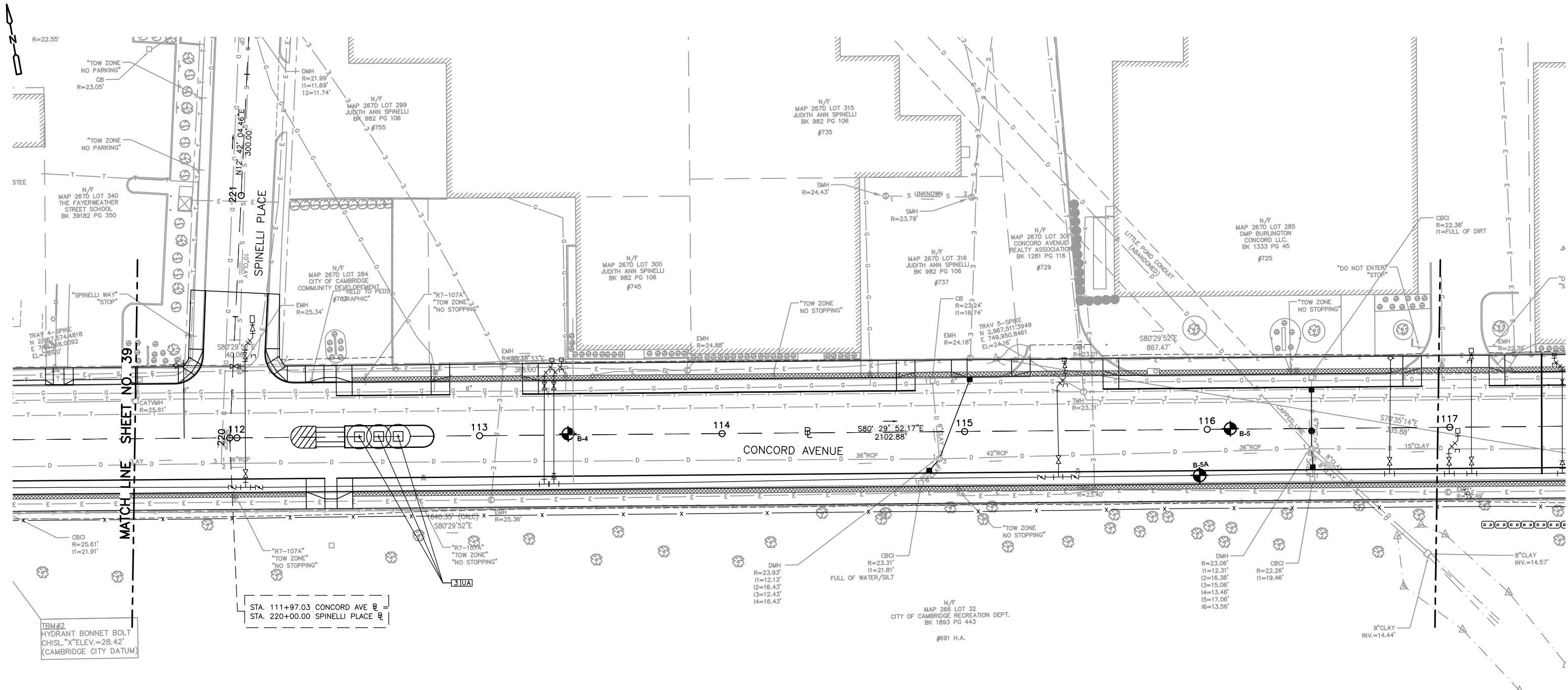
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 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

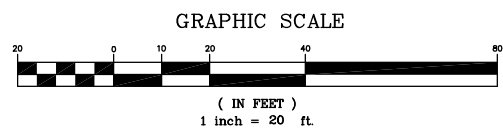
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**LANDSCAPING PLANS**





KEY	BOTANICAL NAME	COMMON NAME	QTY	SIZE	ROOT	COMMENTS
TREES						
3	ULMUS AMERICANA 'PRINCETON'	PRINCETON ELM	3	2.5-3 IN CAL.	B&B	STREET TREE MIN. 6-FT BRANCH HT.



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: H. DAVIS  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

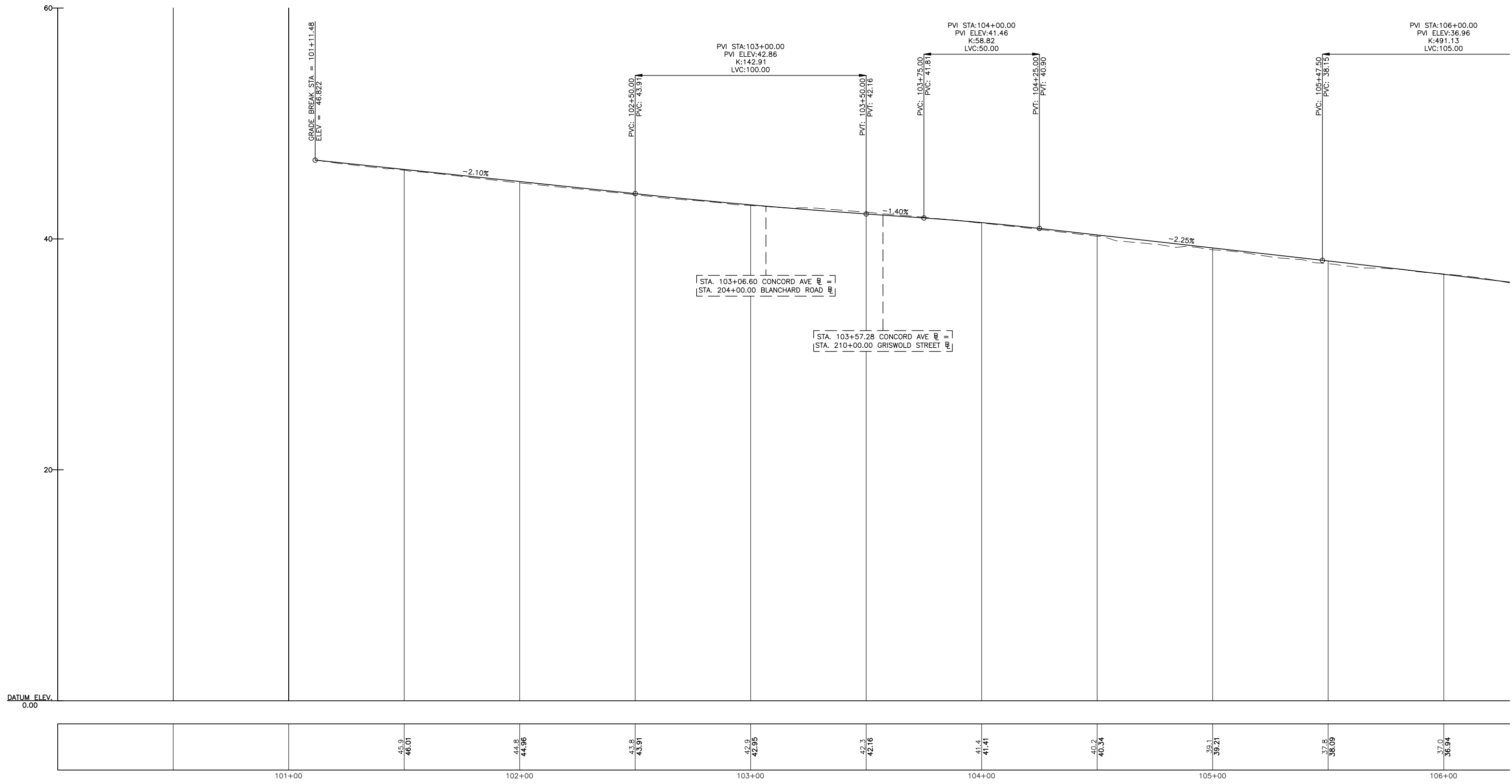
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**LANDSCAPING PLANS**

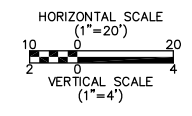
PROJECT NO. 0139-68660  
 FILE NAME: CSTLP001

SHEET NO.  
**40**

Accession No: 0139-P-xxxx



CONT. ON SHEET 42



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: L. SHERMAN  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**PROFILE**

PROJECT NO. 0139-68660  
 FILE NAME: CSTPR001

SHEET NO.  
**41**

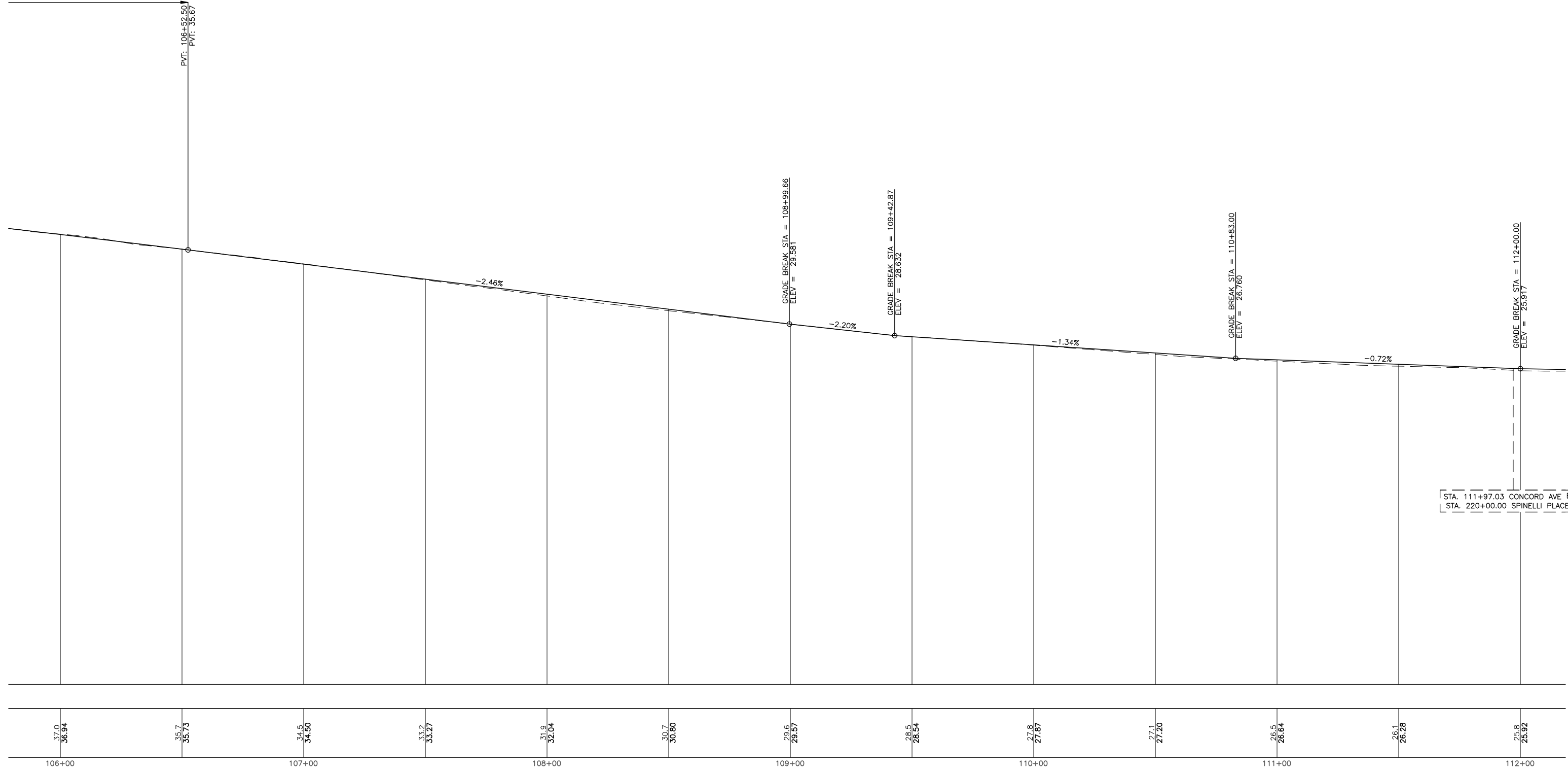
Accession No: 0139-P-xxxx

PVI STA: 106+00.00  
 PVI ELEV: 36.96  
 K: 491.13  
 LVC: 105.00

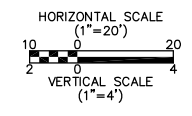
PVI: 106+52.50  
 PVI: 35.67

CONT. FROM  
 SHEET 41

CONT. ON  
 SHEET 43



STA. 111+97.03 CONCORD AVE [R] =  
 STA. 220+00.00 SPINELLI PLACE [R]



REV. NO.	DATE	DRWN	CHKD	REMARKS

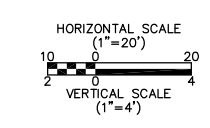
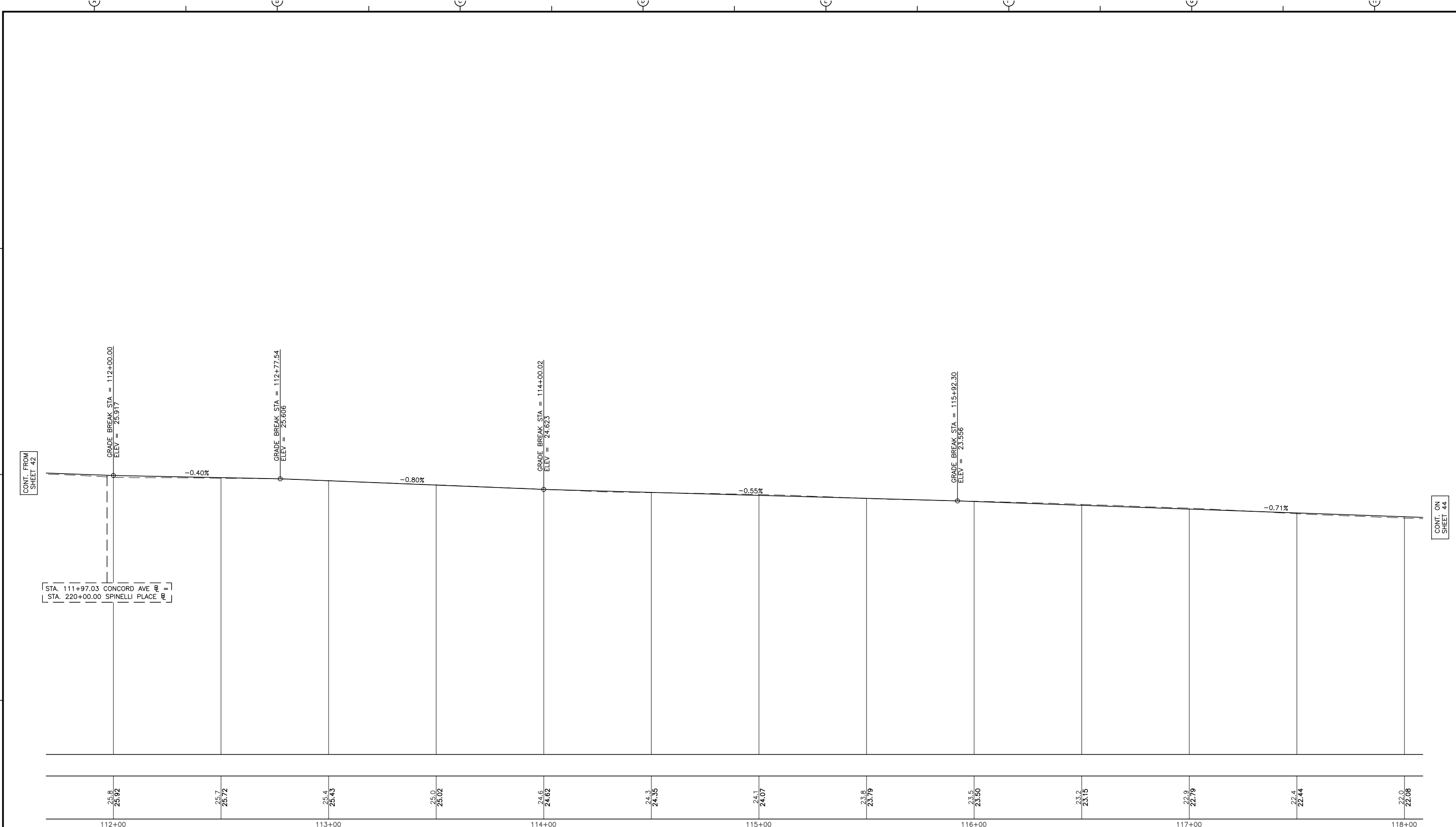
DESIGNED BY: L. SHERMAN  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

**CDM**  
 56 Exchange Terrace  
 Providence, RI 02903  
 Tel: (401) 751-5360  
 consulting • engineering • construction • operations

CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT  
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**PROFILE**

PROJECT NO. 0139-68660  
 FILE NAME: CSTPRO01  
 SHEET NO.  
**42**  
 Accession No: 0139-P-xxxx



REV. NO.	DATE	DRWN	CHKD	REMARKS

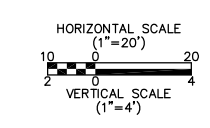
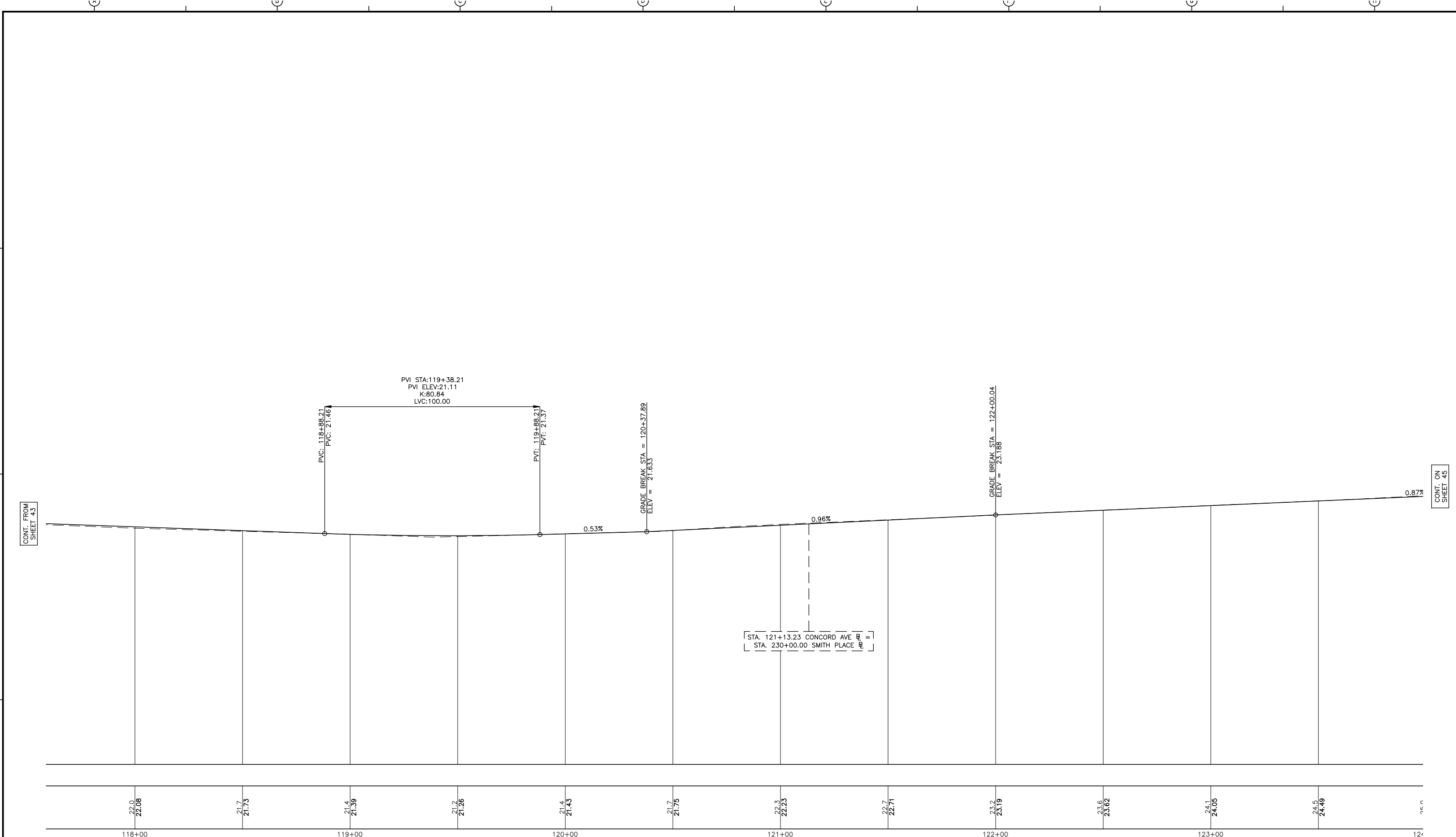
DESIGNED BY: L. SHERMAN  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**PROFILE**

PROJECT NO. 0139-68660  
 FILE NAME: CSTPR001  
 SHEET NO.  
**43**  
 Accession No: 0139-P-xxxx



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: L. SHERMAN  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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 56 Exchange Terrace  
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 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**PROFILE**

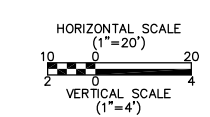
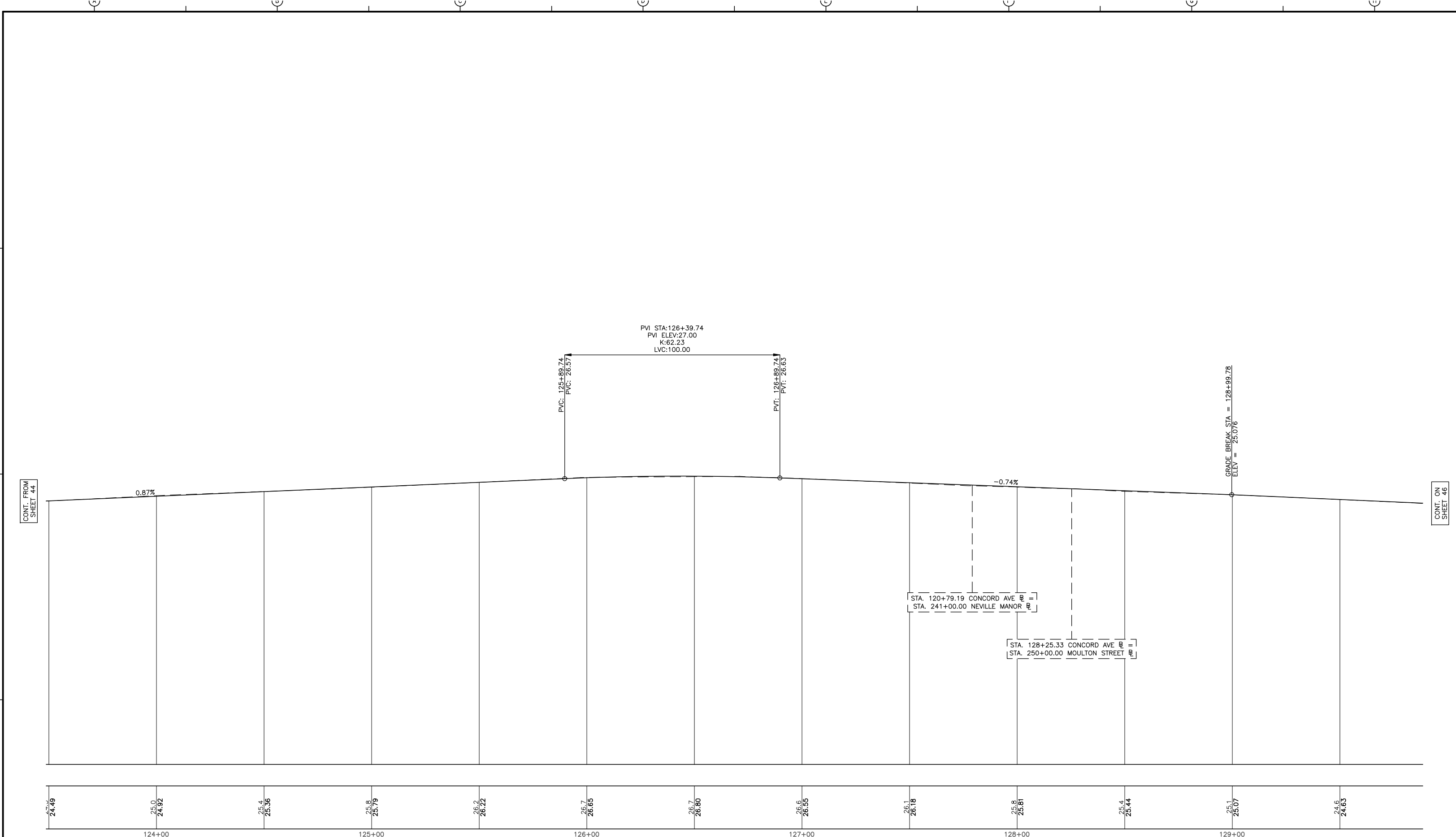
PROJECT NO. 0139-68660  
 FILE NAME: CSTPRO01

SHEET NO.  
**44**

Accession No: 0139-P-xxxx

CONT. FROM  
SHEET 43

CONT. ON  
SHEET 45



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: L. SHERMAN  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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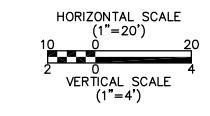
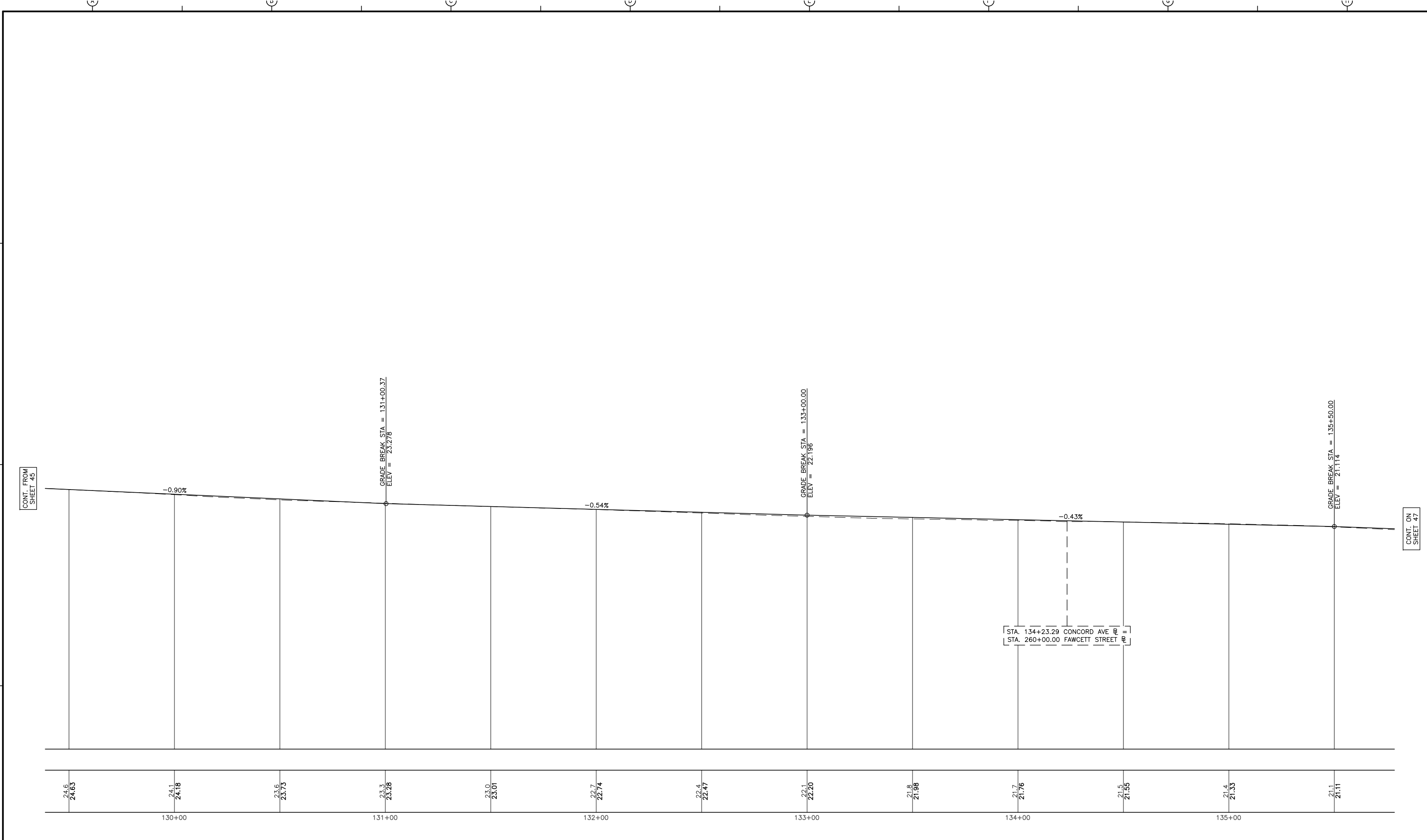
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**PROFILE**

PROJECT NO. 0139-68660  
 FILE NAME: CSTPR001

SHEET NO.  
**45**

Accession No: 0139-P-xxxx



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: L. SHERMAN  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

## CONCORD AVENUE WATER MAIN AND ROADWAY RECONSTRUCTION

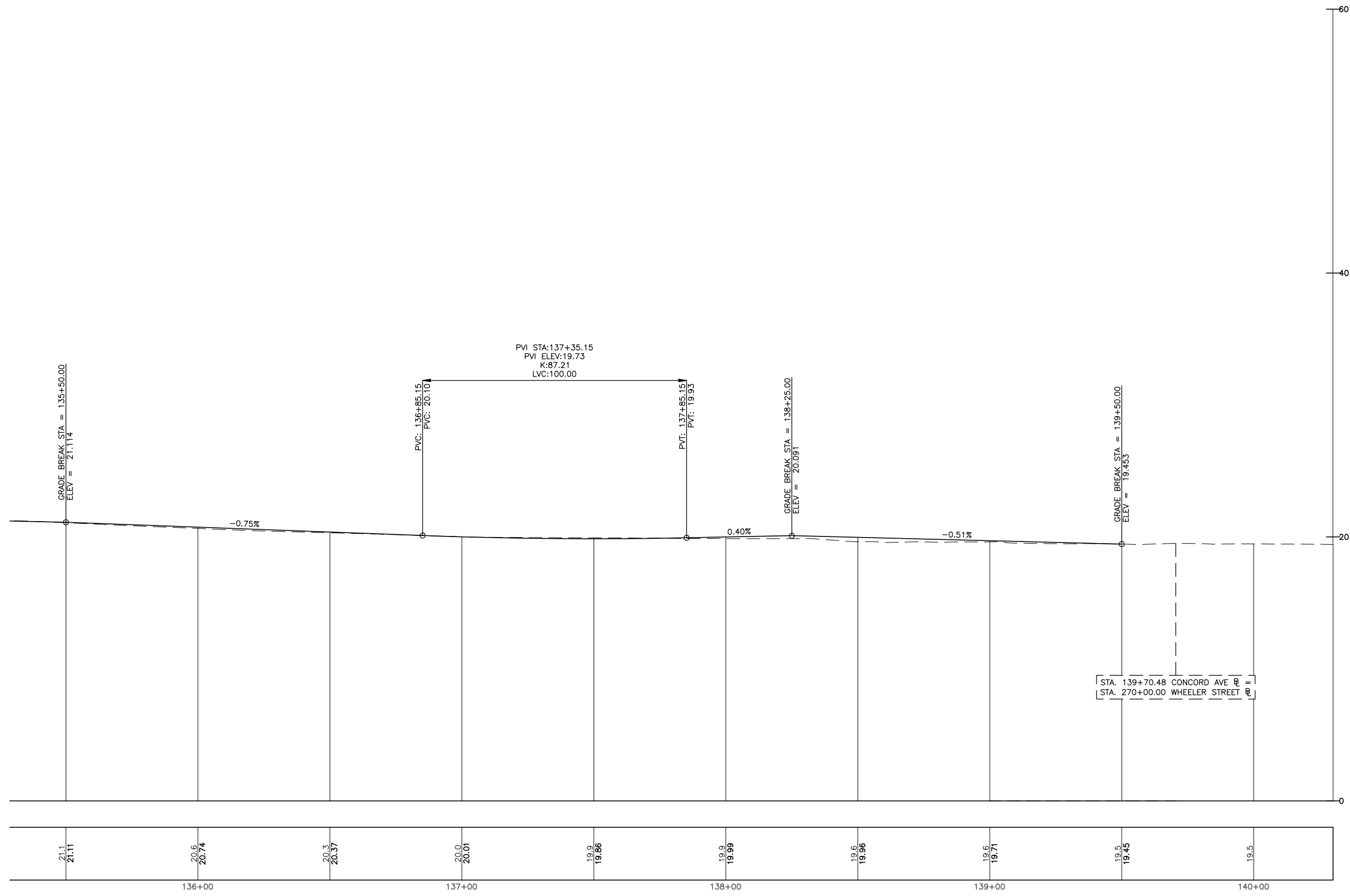
PROFILE

PROJECT NO. 0139-68660  
 FILE NAME: CSTPR001

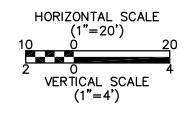
SHEET NO.  
**46**

Accession No: 0139-P-xxxx

CONT. FROM  
SHEET 46



21.1 21.11	20.6 20.74	20.3 20.37	20.0 20.01	19.8 19.86	19.9 19.99	19.6 19.96	19.6 19.71	19.5 19.45	19.5
136+00			137+00		138+00		139+00		140+00



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: L. SHERMAN  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

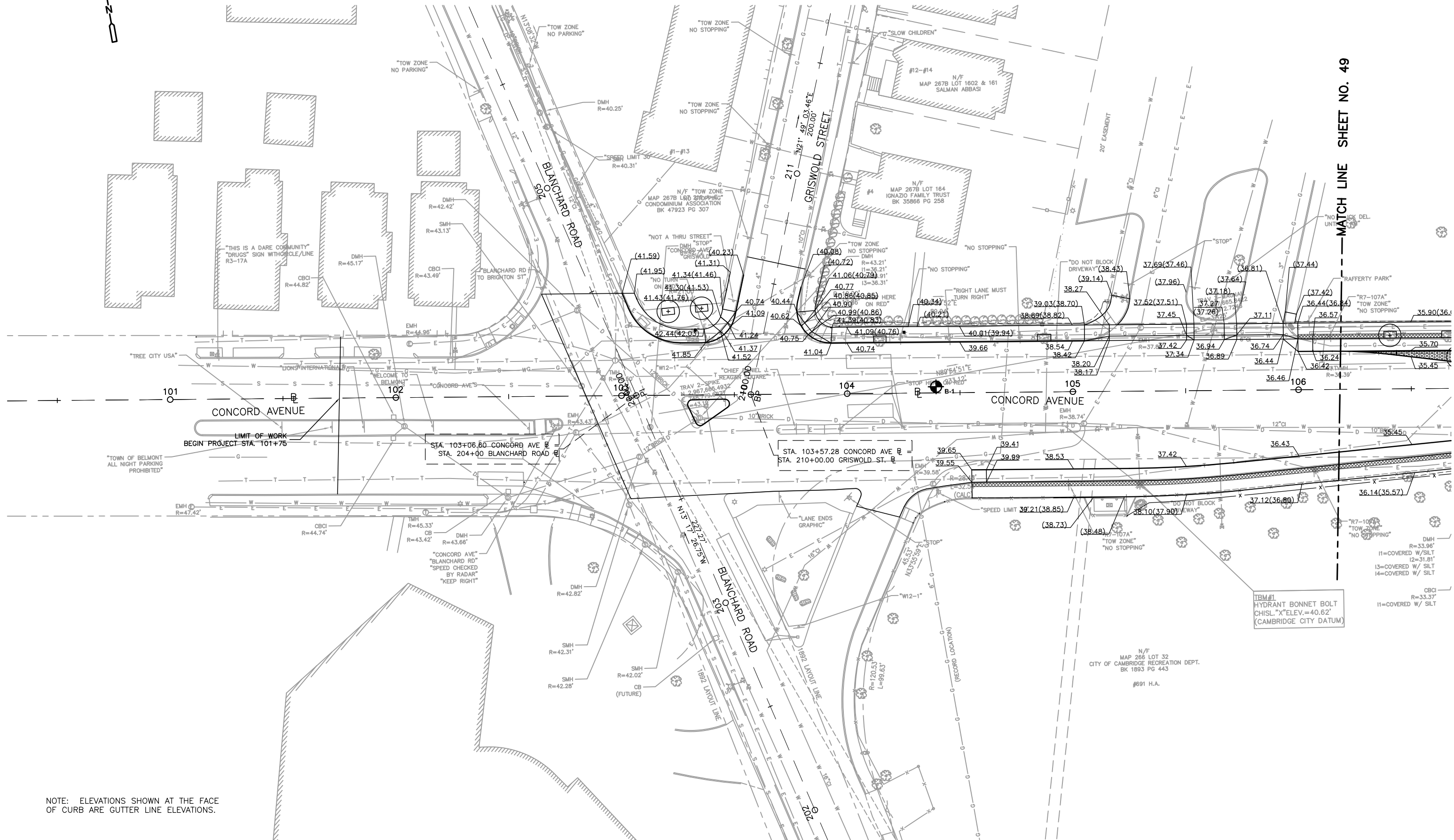
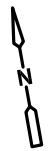
**CDM**  
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CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT  
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**PROFILE**

PROJECT NO. 0139-68660  
 FILE NAME: CSTPRO01  
 SHEET NO.  
**47**  
 Accession No: 0139-P-xxxx





MATCH LINE SHEET NO. 49

"TREE CITY USA"

"TOWN OF BELMONT ALL NIGHT PARKING PROHIBITED"

LIMIT OF WORK BEGIN PROJECT STA. 101+75

STA. 103+06.60 CONCORD AVE @ STA. 204+00 BLANCHARD ROAD @

STA. 103+57.28 CONCORD AVE @ STA. 210+00.00 GRISWOLD ST. @

TRM#1 HYDRANT BONNET BOLT CHISL. "X" ELEV. = 40.62' (CAMBRIDGE CITY DATUM)

DMH R=33.96'  
11=COVERED W/ SILT  
12=31.81'  
13=COVERED W/ SILT  
14=COVERED W/ SILT  
CBCI R=33.37'  
11=COVERED W/ SILT

N/F MAP 266 LOT 32 CITY OF CAMBRIDGE RECREATION DEPT. BK 1893 PG 443 #691 H.A.

NOTE: ELEVATIONS SHOWN AT THE FACE OF CURB ARE GUTTER LINE ELEVATIONS.

GRAPHIC SCALE



( IN FEET )  
1 inch = 20 ft.

REV. NO.	DATE	DRWN	CHKD	REMARKS

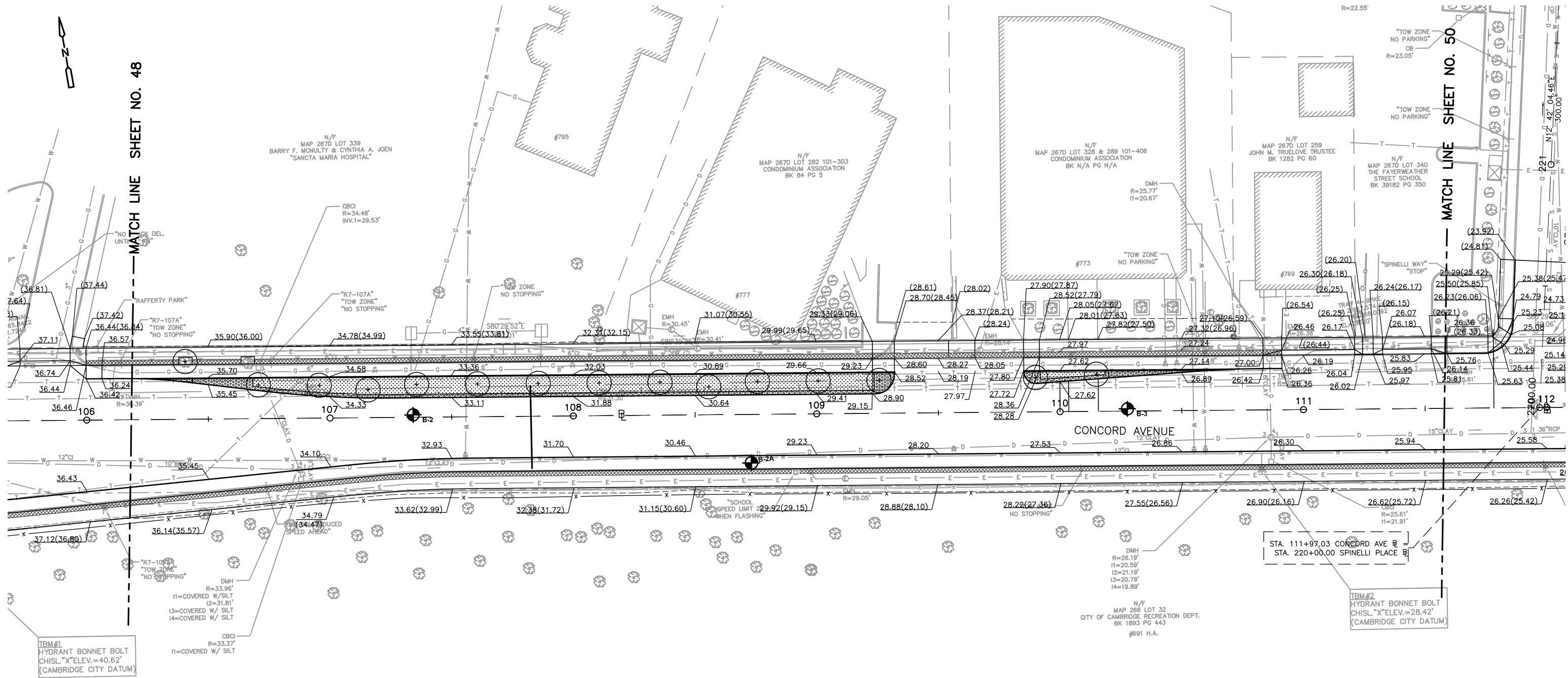
DESIGNED BY: K. THOMAS  
 DRAWN BY: K. THOMAS  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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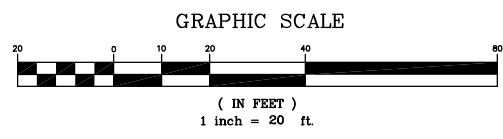
CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT  
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

GRADING PLANS

PROJECT NO. 0139-68660  
 FILE NAME: CSTGP001  
 SHEET NO. **48**  
 Accession No: 0139-P-xxxx



NOTE: ELEVATIONS SHOWN AT THE FACE OF CURB ARE GUTTER LINE ELEVATIONS.



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: K. THOMAS  
 DRAWN BY: K. THOMAS  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

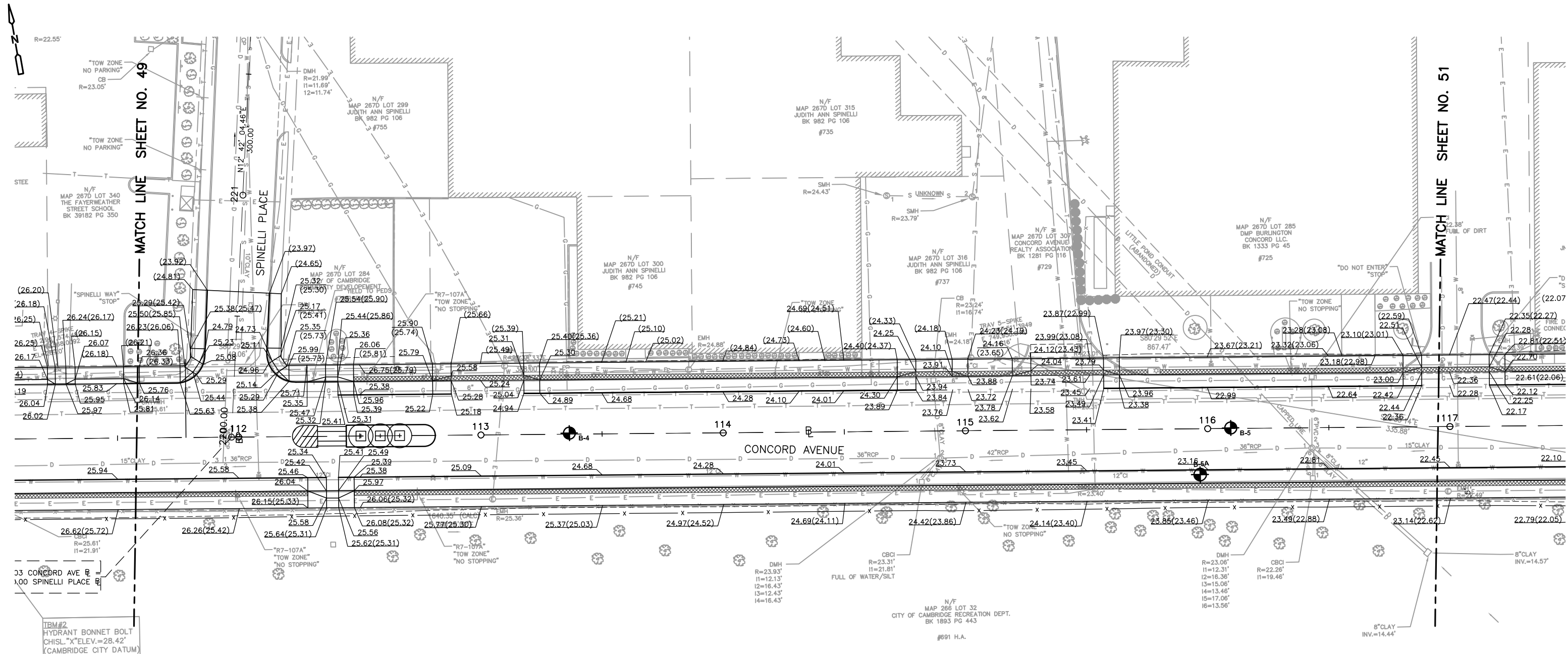
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**GRADING PLANS**

PROJECT NO. 0139-68660  
 FILE NAME: CSTGP001

SHEET NO.  
**49**

Accession No: 0139-P-xxxx



MATCH LINE SHEET NO. 49

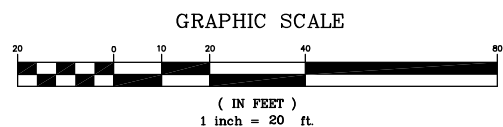
MATCH LINE SHEET NO. 51

CONCORD AVENUE

SPINELLI PLACE

D-2-D

NOTE: ELEVATIONS SHOWN AT THE FACE OF CURB ARE GUTTER LINE ELEVATIONS.



REV. NO.	DATE	DRWN	CHKD	REMARKS

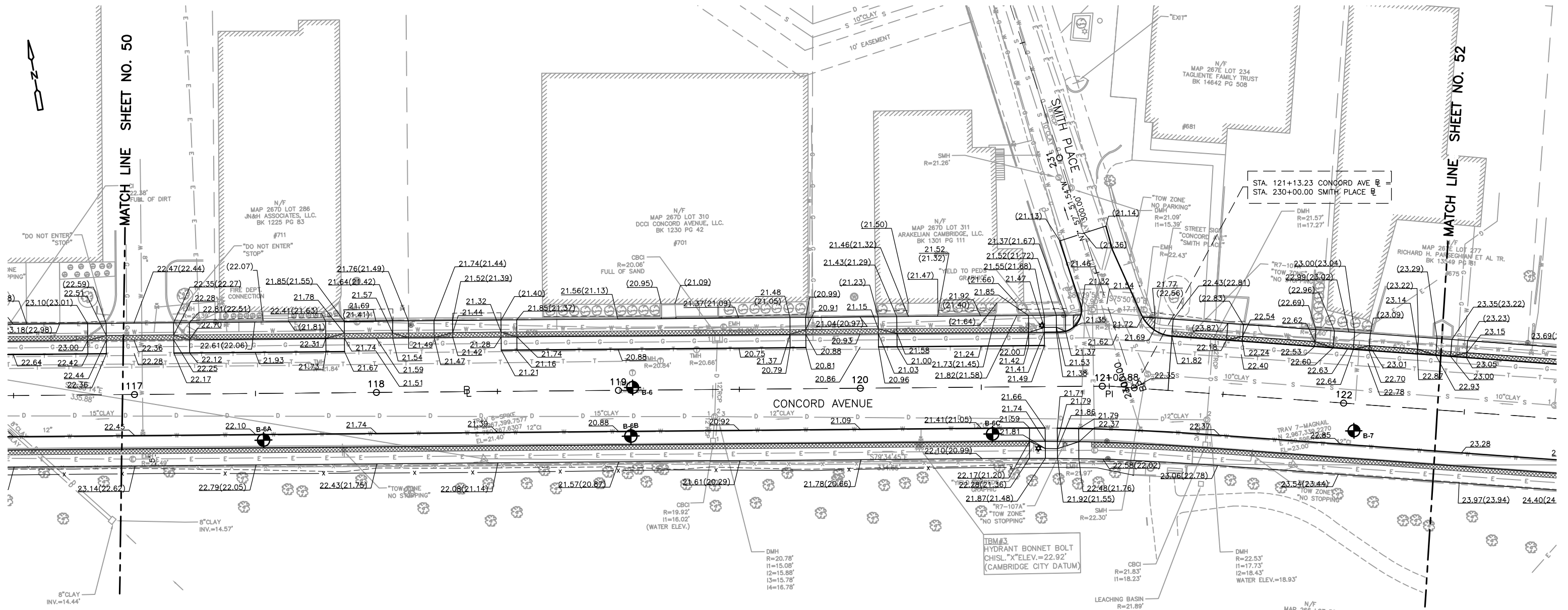
DESIGNED BY: K. THOMAS  
 DRAWN BY: K. THOMAS  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT  
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**GRADING PLANS**

PROJECT NO. 0139-68660  
 FILE NAME: CSTGPO01  
 SHEET NO. **50**  
 Accession No: 0139-P-xxxx



NOTE: ELEVATIONS SHOWN AT THE FACE OF CURB ARE GUTTER LINE ELEVATIONS.

GRAPHIC SCALE



REV. NO.	DATE	DRWN	CHKD	REMARKS

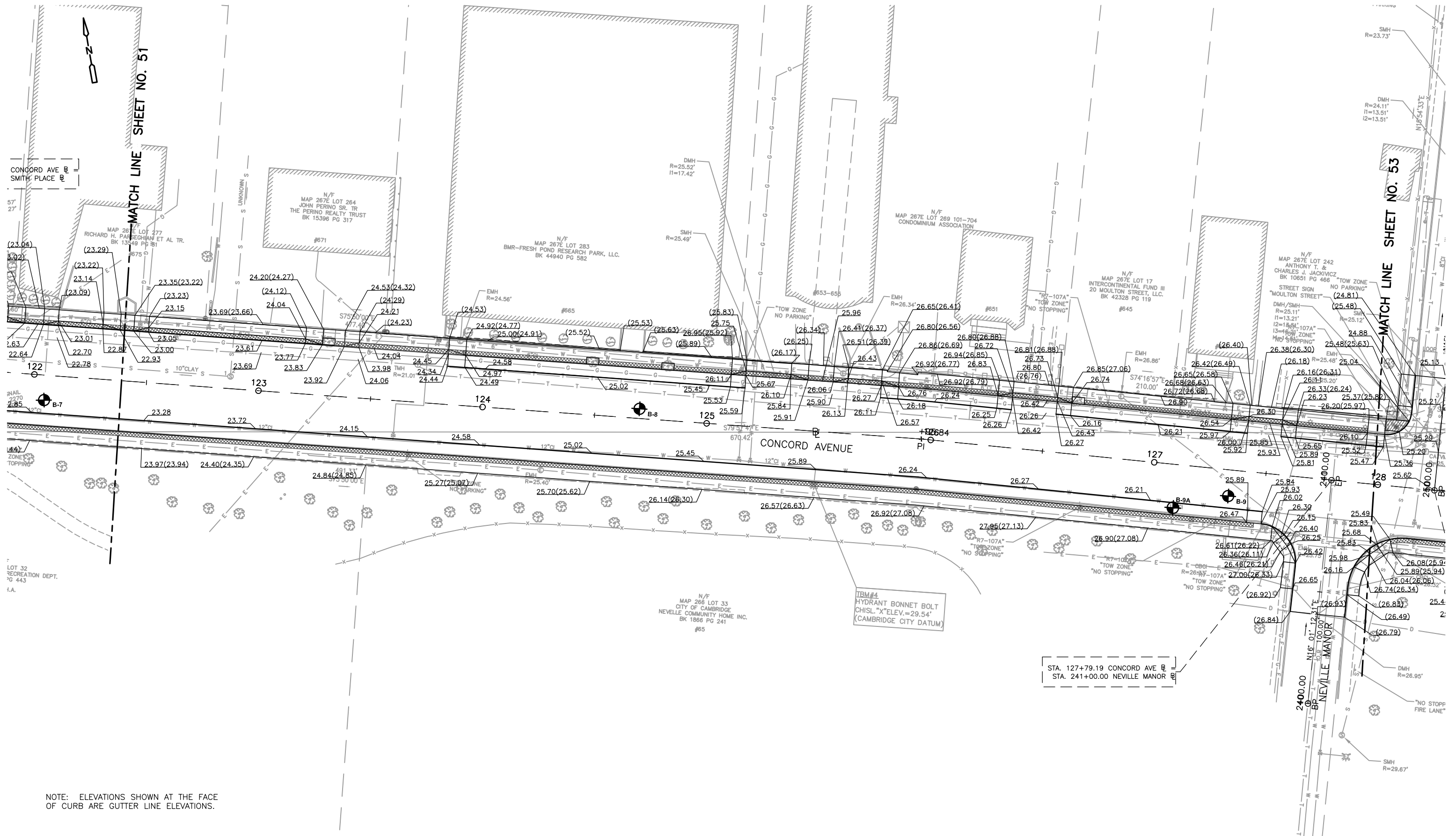
DESIGNED BY: K. THOMAS  
 DRAWN BY: K. THOMAS  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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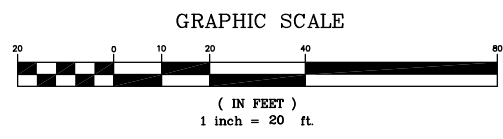
CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT  
**CONCORD AVENUE**  
**WATER MAIN AND ROADWAY RECONSTRUCTION**

**GRADING PLANS**

PROJECT NO. 0139-68660  
 FILE NAME: CSTGP001  
 SHEET NO.  
**51**  
 Accession No: 0139-P-xxxx



NOTE: ELEVATIONS SHOWN AT THE FACE OF CURB ARE GUTTER LINE ELEVATIONS.



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: K. THOMAS  
 DRAWN BY: K. THOMAS  
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 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
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CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

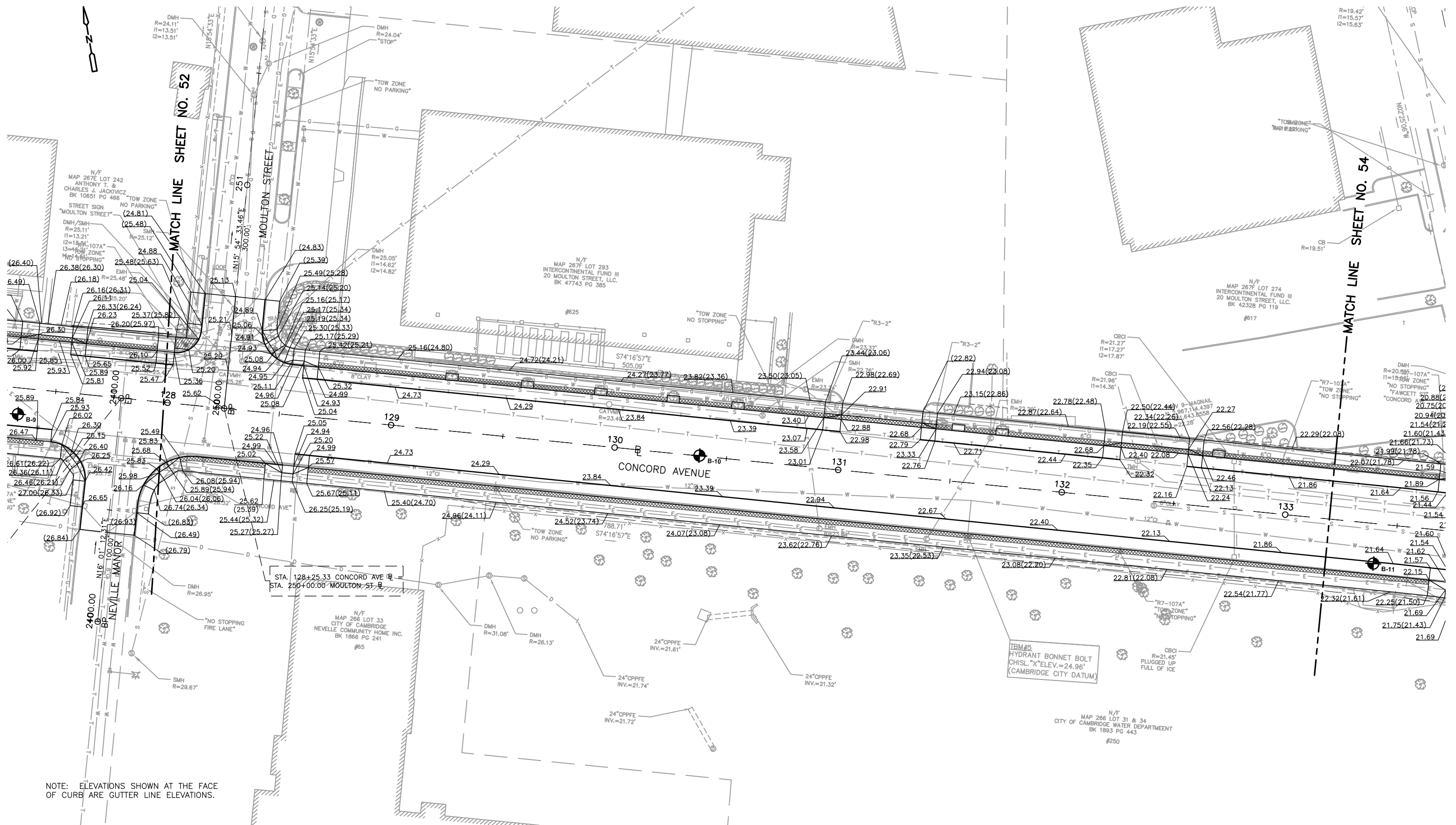
## CONCORD AVENUE WATER MAIN AND ROADWAY RECONSTRUCTION

## GRADING PLANS

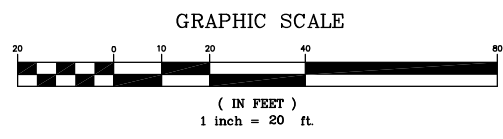
PROJECT NO. 0139-68660  
 FILE NAME: CSTGP001

SHEET NO.  
**52**

Accession No: 0139-P-xxxx



NOTE: ELEVATIONS SHOWN AT THE FACE OF CURB ARE GUTTER LINE ELEVATIONS.



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: K. THOMAS  
 DRAWN BY: K. THOMAS  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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 56 Exchange Terrace  
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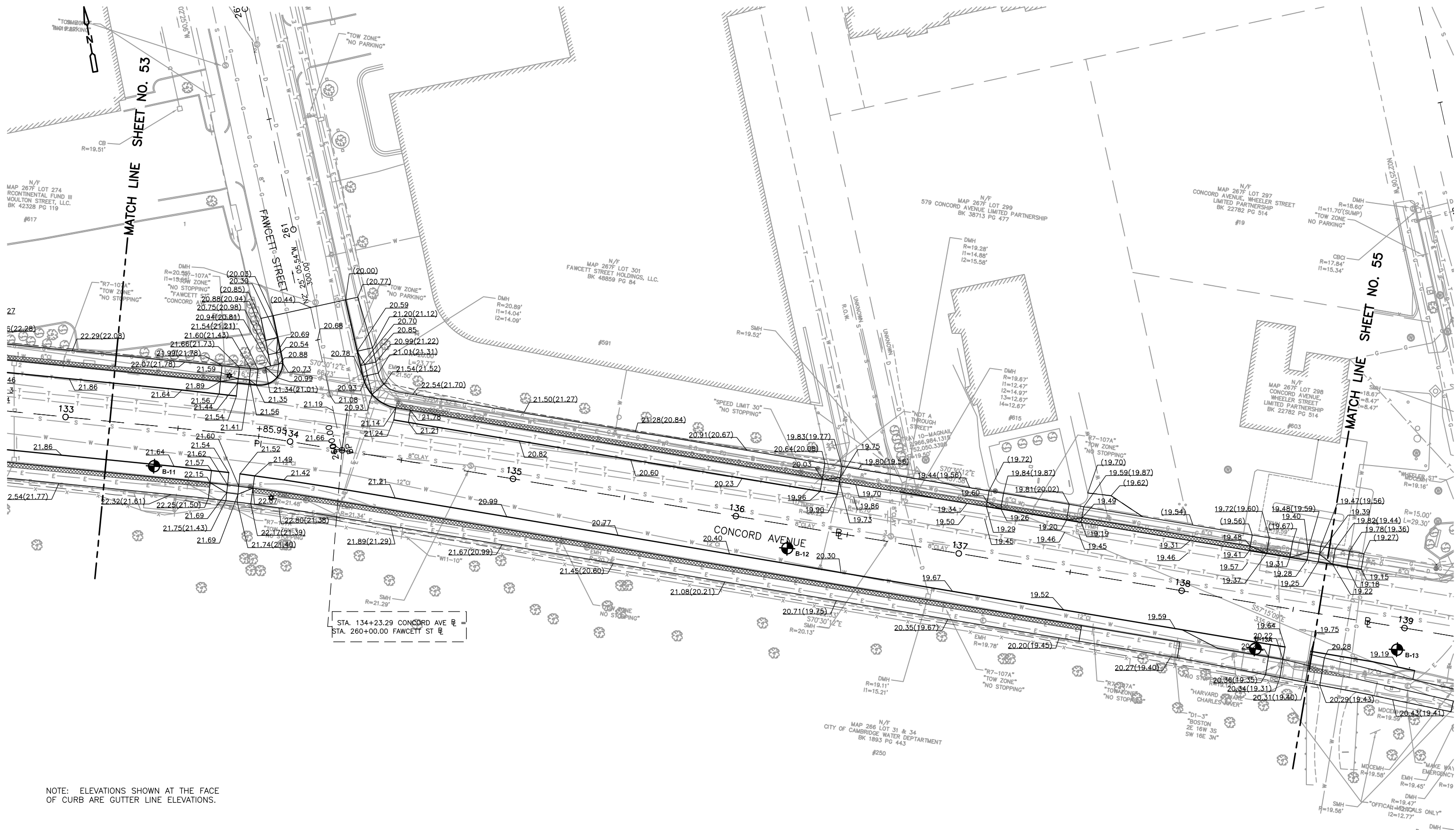
CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

## CONCORD AVENUE WATER MAIN AND ROADWAY RECONSTRUCTION

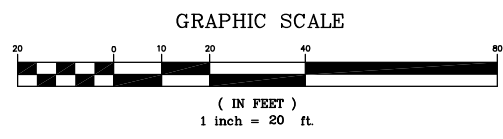
## GRADING PLANS

SHEET NO.  
**53**

PROJECT NO. 0139-68660  
 FILE NAME: CSTGP001  
 Accession No: 0139-P-xxxx



NOTE: ELEVATIONS SHOWN AT THE FACE OF CURB ARE GUTTER LINE ELEVATIONS.



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: K. THOMAS  
 DRAWN BY: K. THOMAS  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

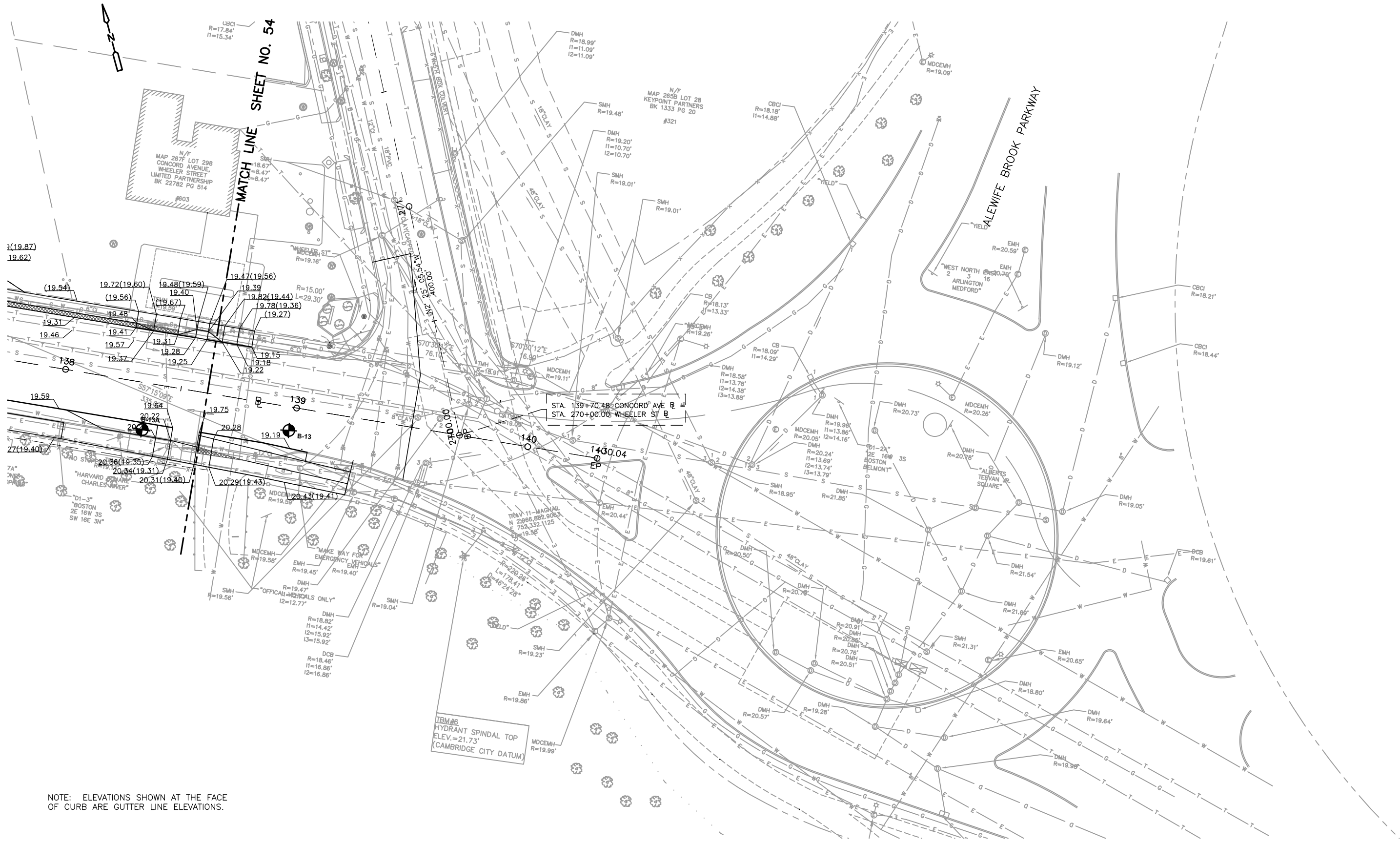
## CONCORD AVENUE WATER MAIN AND ROADWAY RECONSTRUCTION

## GRADING PLANS

PROJECT NO. 0139-68660  
 FILE NAME: CSTGP001

SHEET NO.  
**54**

Accession No: 0139-P-xxxx

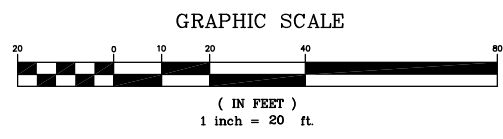


19.87  
 19.62  
 19.54  
 19.72(19.60)  
 19.48(19.56)  
 19.40  
 19.67(19.59)  
 19.39  
 19.47(19.56)  
 19.39  
 19.82(19.44)  
 19.78(19.36)  
 19.27  
 19.31  
 19.46  
 19.41  
 19.57  
 19.31  
 19.28  
 19.15  
 19.16  
 19.22  
 19.59  
 19.64  
 20.22  
 19.75  
 19.19  
 20.28  
 19.19  
 20.36(19.35)  
 20.34(19.31)  
 20.31(19.40)  
 20.29(19.43)  
 20.43(19.41)

STA. 139+70.48 CONCORD AVE E  
 STA. 270+00.00 WHEELER ST E

TBW#6  
 HYDRANT SPINDAL TOP  
 ELEV. = 21.73'  
 (CAMBRIDGE CITY DATUM)

NOTE: ELEVATIONS SHOWN AT THE FACE OF CURB ARE GUTTER LINE ELEVATIONS.



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: K. THOMAS  
 DRAWN BY: K. THOMAS  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
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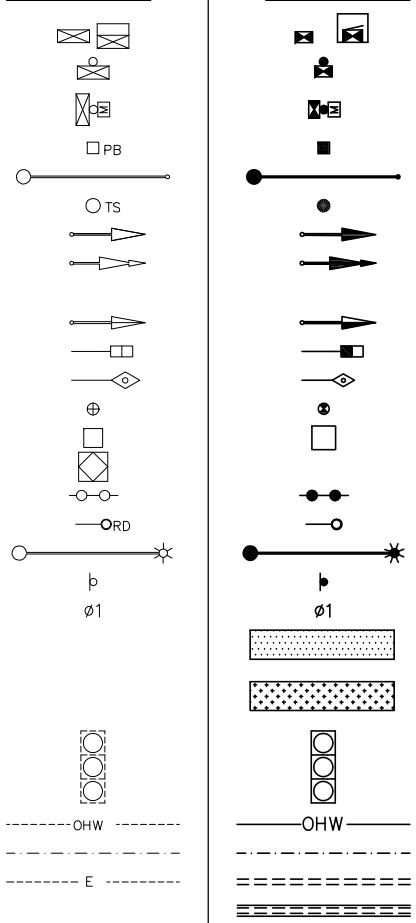
CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT  
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**GRADING PLANS**

PROJECT NO. 0139-68660  
 FILE NAME: CSTGP001  
 SHEET NO.  
**55**  
 Accession No: 0139-P-xxxx



**EXISTING**      **PROPOSED**



**TRAFFIC SIGNAL LEGEND**

CONTROL CABINET GROUND MOUNTED (WITH & WITHOUT CONC. PAD)  
 CONTROL CABINET POLE MOUNTED  
 FLASHING BEACON CONTROL & METER PEDESTAL  
 PULL BOX (12" x 12" OR AS NOTED)  
 MAST ARM, SHAFT & BASE (ARM LENGTH AS NOTED)  
 SIGNAL POST & BASE (ALPHA-NUMERIC DESIGNATION NOTED)  
 VEHICULAR SIGNAL HEAD (ALPHA-NUMERIC DESIGNATION NOTED)  
 VEHICULAR SIGNAL HEAD, OPTICALLY PROGRAMMED (ALPHA-NUMERIC DESIGNATION NOTED)  
 FLASHING BEACON (ALPHA-NUMERIC DESIGNATION NOTED)  
 PEDESTRIAN SIGNAL HEAD (ALPHA-NUMERIC DESIGNATION NOTED)  
 EMERGENCY PREEMPTION DETECTOR (OPTICOM)  
 PEDESTRIAN PUSH BUTTON, SIGN & SADDLE  
 WIRE LOOP DETECTOR (6' x 6' OR AS NOTED)  
 HIGH MAST POLE OR TOWER  
 MAGNETOMETER  
 RADAR DETECTOR  
 SIGNAL & LIGHTING MAST ARM  
 TRAFFIC SIGN & POST  
 CONTROLLER PHASE ACTUATED  
 ZONE OF DETECTION FOR SPECIAL DETECTORS  
 ZONE OF VISIBILITY FOR PROGRAMMED SIGNAL  
 TRAFFIC SIGNAL HEAD (12" LENSES OR AS NOTED)  
 OVERHEAD WIRE(S)  
 DIRECT BURIAL CABLE  
 TRAFFIC SIGNAL CONDUIT  
 CONDUIT CROSSING ROADWAY WITH FLOWABLE FILL

**PAVEMENT MARKING AND SIGNING NOTES**

1. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS NOTED OTHERWISE.
2. ALL PROPOSED PAVEMENT MARKINGS SHALL BE THERMOPLASTIC.
3. RAISED PAVEMENT MARKERS SHALL BE PLACED AT 40' ON CENTER.

**TRAFFIC SIGNAL NOTES**

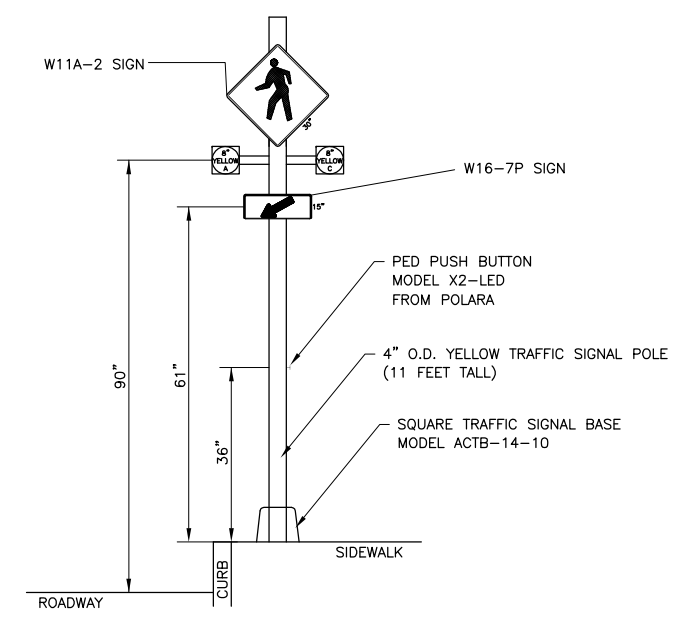
1. CONSTRUCTION OF THE TRAFFIC CONTROL SIGNAL SYSTEMS SHOWN ON THE FOLLOWING DRAWINGS SHALL CONFORM TO THE MASSACHUSETTS HIGHWAY DEPARTMENT'S "STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES", 1988 ED. AS AMENDED, AND THE FEDERAL HIGHWAY ADMINISTRATION'S "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", 2003 EDITION AS AMENDED.
2. ALL OVERHEAD CONDUCTORS FOR SIGNAL HOUSINGS SHALL BE STRANDED WIRE.
3. ALL REPLACED WIRE LOOP DETECTORS SHALL BE CENTERED WITHIN RESPECTIVE LANES UNLESS OTHERWISE NOTED.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING AND VERIFYING THAT THERE IS SUFFICIENT CLEARANCE BETWEEN ALL PROPOSED TRAFFIC SIGNAL POLES AND EXISTING AND RELOCATED OVERHEAD UTILITY LINES. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR COORDINATING WITH THE AFFECTED UTILITY COMPANIES RELATIVE TO THE SCOPE OF ANY REQUIRED RELOCATIONS. THIS SHALL BE PERFORMED WITHIN TEN DAYS AFTER AWARD OF THE CONTRACT.

**LOOP DETECTOR NOTES**

1. SEE LOOP DETECTOR DETAIL SHEET FOR SPLICE PATTERN AND OTHER INFORMATION.
2. DELAY AND EXTENSION TIMES ARE IN SECONDS.
3. DELAY TIME SHALL BE EFFECTIVE ONLY DURING THE RED PORTION OF THE PHASE THAT IS CALLED BY A DETECTOR.

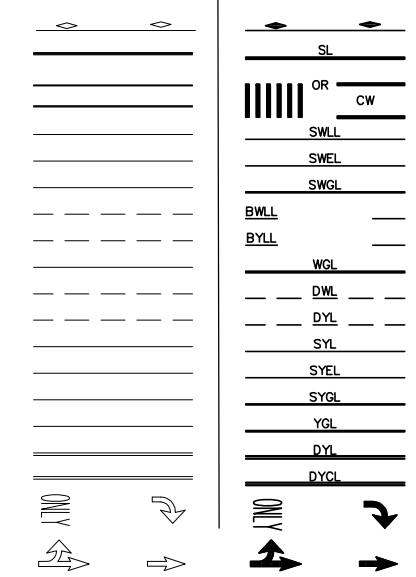
**GENERAL ABBREVIATIONS**

MAX	MAXIMUM
MIN	MINIMUM
BO	BY OTHERS
PROP	PROPOSED
R & D	REMOVE AND DISPOSE
R & R	REMOVE AND RESET
R & S	REMOVE AND STACK
REM	REMOVE
RET	RETAIN



**CITY OF CAMBRIDGE  
 PEDESTRIAN WARNING DEVICE  
 TRAFFIC SIGNAL  
 (NOT TO SCALE)**

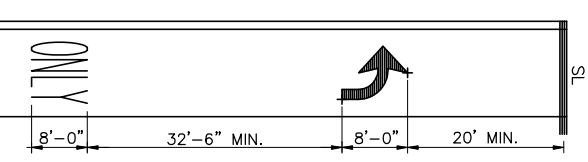
**EXISTING**      **PROPOSED**



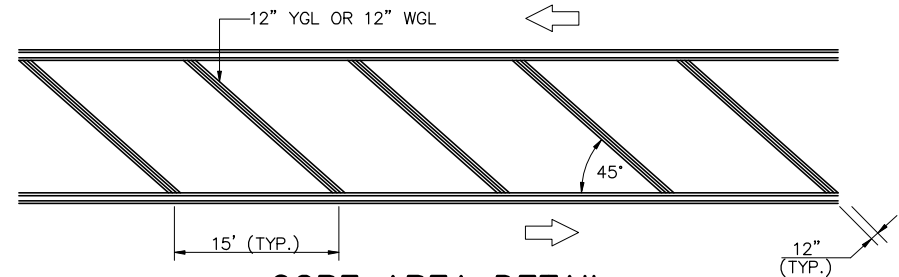
**PAVEMENT MARKING LEGEND**

REFLECTORIZED PAVEMENT MARKER  
 STOP LINE - 12"  
 CROSSWALK - 2x12" WHITE LINES  
 SOLID WHITE LANE LINE - 4" UNLESS NOTED OTHERWISE  
 SOLID WHITE EDGE LINE - 4" UNLESS NOTED OTHERWISE  
 SOLID WHITE GORE LINE - 8"  
 \*BROKEN WHITE LANE LINE - 4" UNLESS NOTED OTHERWISE  
 \*BROKEN YELLOW LANE LINE - 4" UNLESS NOTED OTHERWISE  
 WHITE GORE LINE - 12"  
 \*\*DASHED WHITE LINE - 4"  
 \*\*DASHED YELLOW LINE - 4"  
 SOLID YELLOW LINE - 4" UNLESS NOTED OTHERWISE  
 SOLID YELLOW EDGE LINE - 4" UNLESS NOTED OTHERWISE  
 SOLID YELLOW GORE LINE - 8"  
 YELLOW GORE LINE - 12"  
 DOUBLE YELLOW LINE - 2x4" UNLESS NOTED OTHERWISE  
 DOUBLE YELLOW CENTER LINE - 2x4" UNLESS NOTED OTHERWISE  
 PAVEMENT ARROW & LEGEND  
 PAVEMENT ARROWS

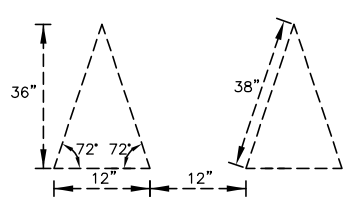
\*BROKEN LANE LINES TO BE 10' IN LENGTH WITH 30' GAP (TYP.)  
 \*\*DASHED LINES TO BE 5' IN LENGTH WITH 5' GAP (TYP.)



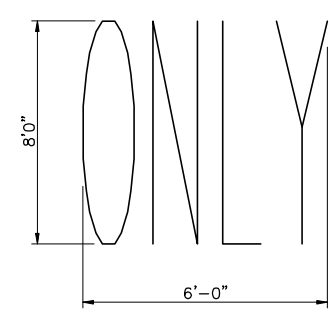
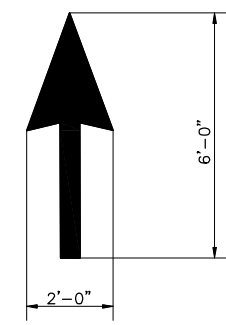
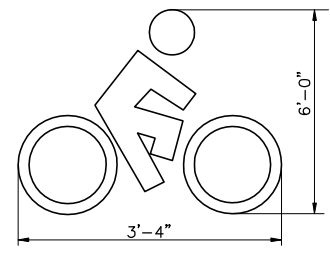
**ARROW & ONLY DETAIL**  
 NOT TO SCALE



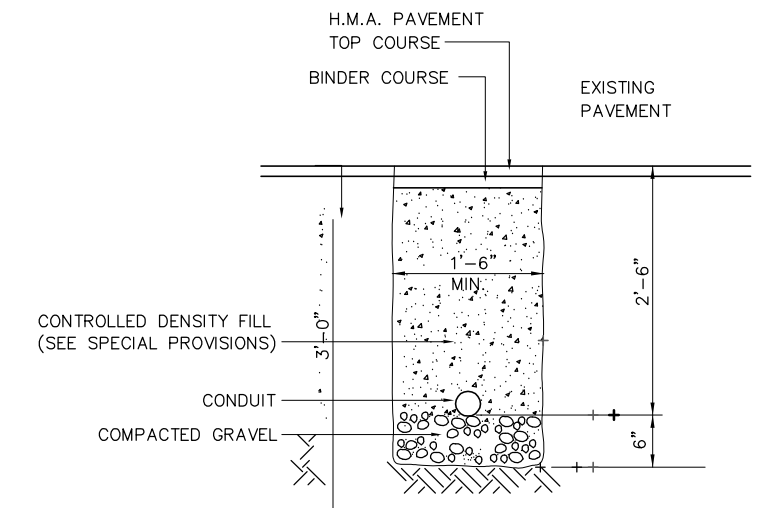
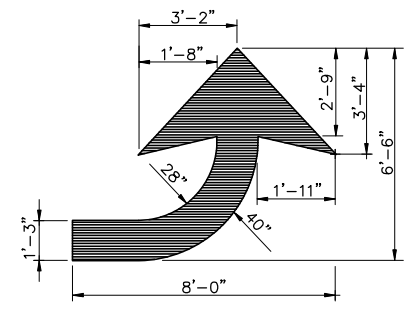
**GORE AREA DETAIL**  
 NOT TO SCALE



**YIELD LINE DETAIL**  
 NOT TO SCALE

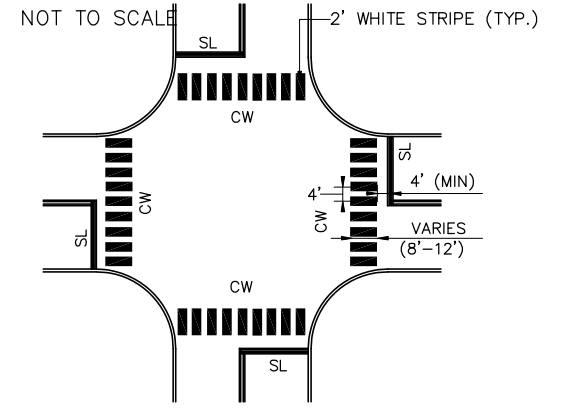


NOTE: ARROW & ONLY=APPROX. 46.28 S.F.



NOTE: FLOWABLE MIX TRENCH REQ'D ONLY IN AREAS OF EXIST. ROADWAY PAVEMENT THAT DO NOT REQUIRE FULL DEPTH CONSTRUCTION.

**TRAFFIC SIGNAL CONDUIT TRENCH DETAIL**



**TYPICAL CROSSWALK MARKINGS**  
 NOT TO SCALE

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: A. HEALEY  
 DRAWN BY: A. HEALEY  
 SHEET CHK'D BY: L. SHERMAN  
 CROSS CHK'D BY: K. JOHNSON  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

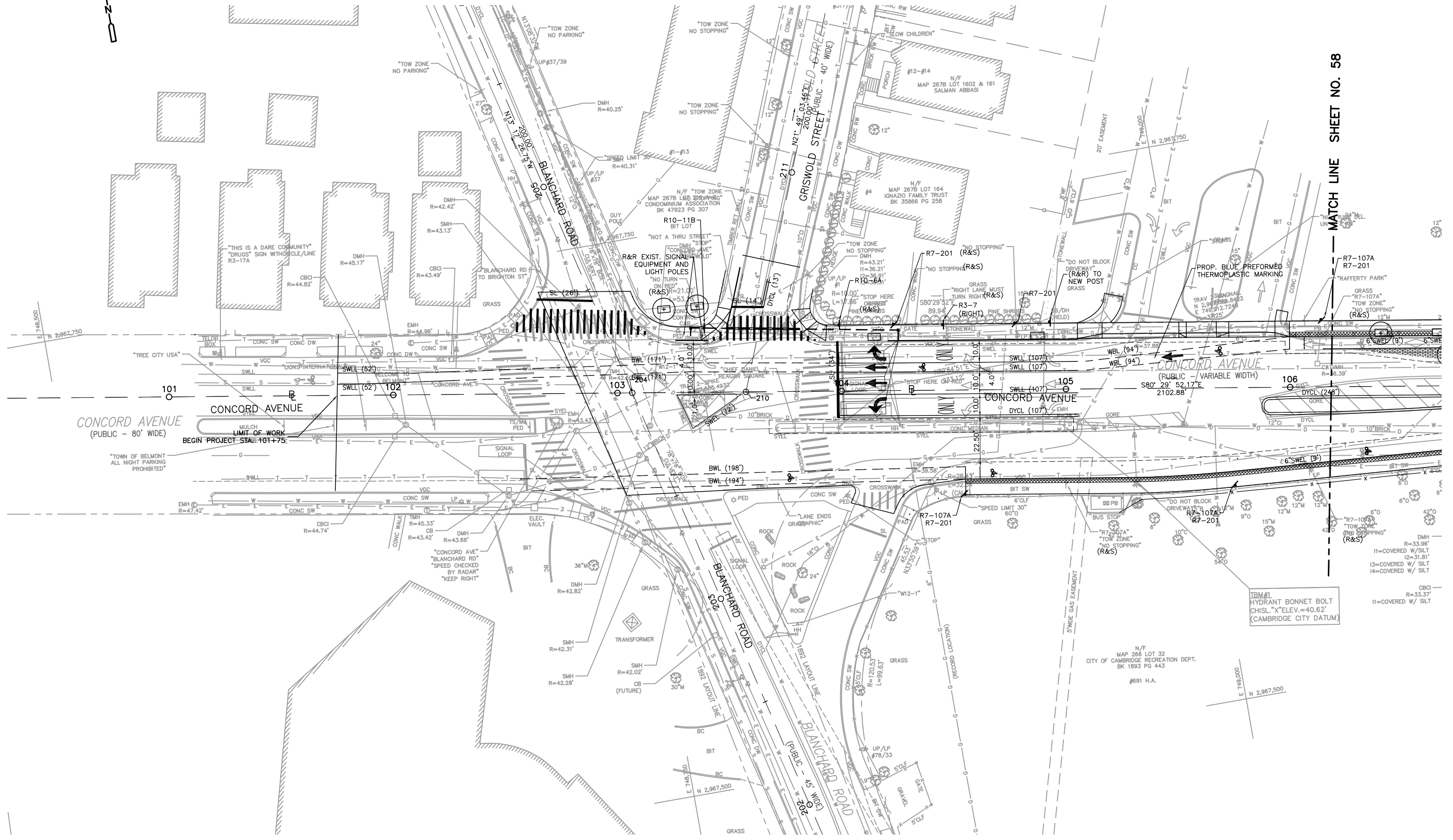
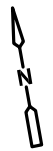
**CDM**  
 56 Exchange Terrace  
 Providence, RI 02903  
 Tel: (401) 751-5360  
 consulting • engineering • construction • operations

CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**TRAFFIC LEGEND, ABBREVIATIONS, & NOTES**

PROJECT NO. 0139-68660  
 FILE NAME: CSTAB003  
 SHEET NO. **56**  
 Accession No: 0139-P-xxxx



MATCH LINE SHEET NO. 58

GRAPHIC SCALE



( IN FEET )  
1 inch = 20 ft.

REV. NO.	DATE	DRWN	CHKD	REMARKS

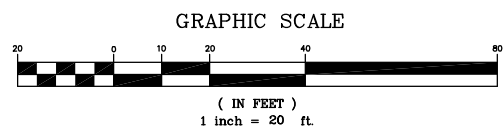
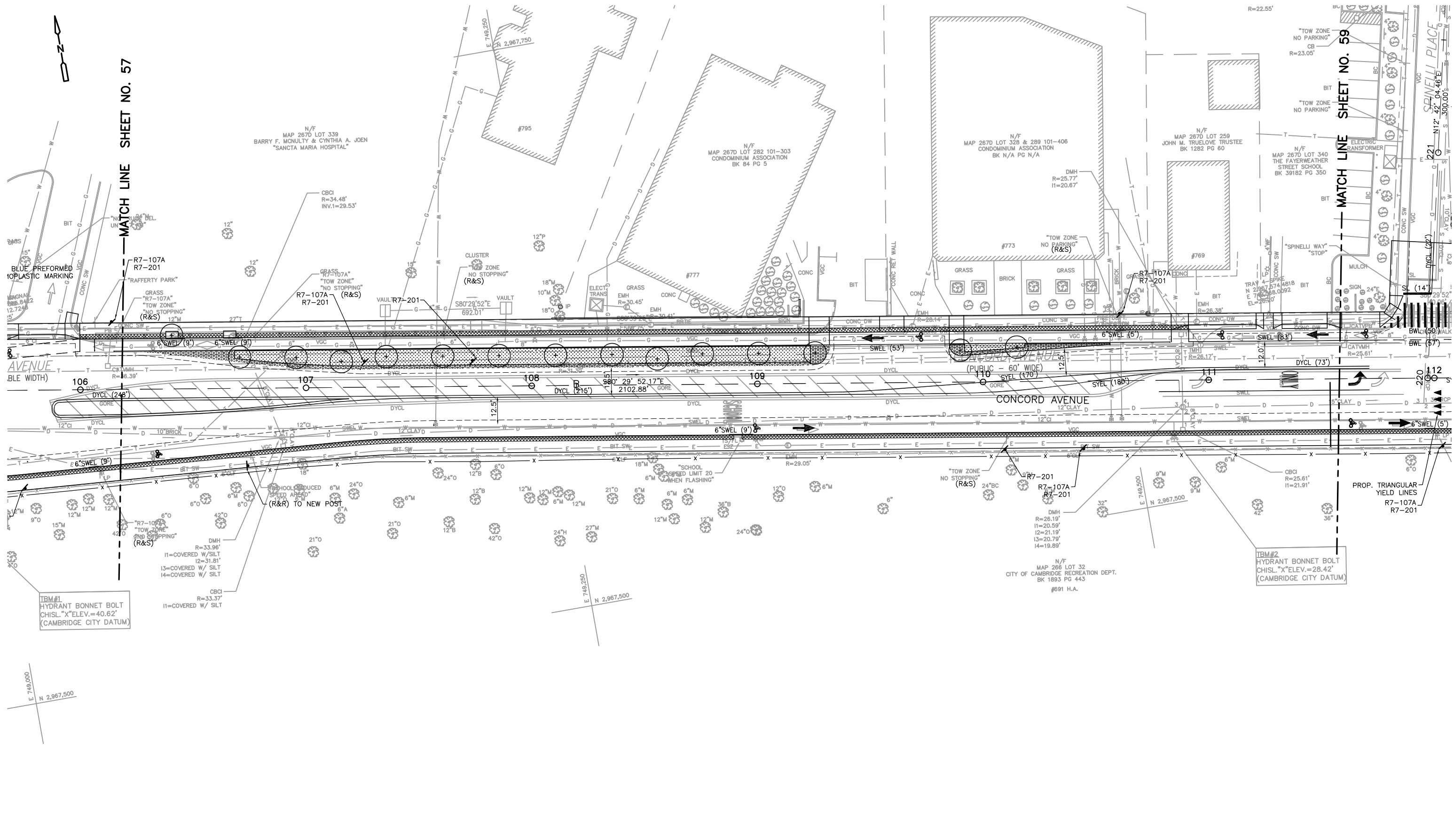
DESIGNED BY: S. MURPHY  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

**CDM**  
 56 Exchange Terrace  
 Providence, RI 02903  
 Tel: (401) 751-5360  
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CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT  
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**PAVEMENT MARKING & SIGNING PLAN**

PROJECT NO. 0139-68660  
 FILE NAME: C5TP5001  
 SHEET NO.  
**57**  
 Accession No: 0139-P-xxxx



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. MURPHY  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

**CDM**  
 56 Exchange Terrace  
 Providence, RI 02903  
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CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

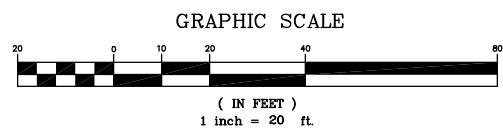
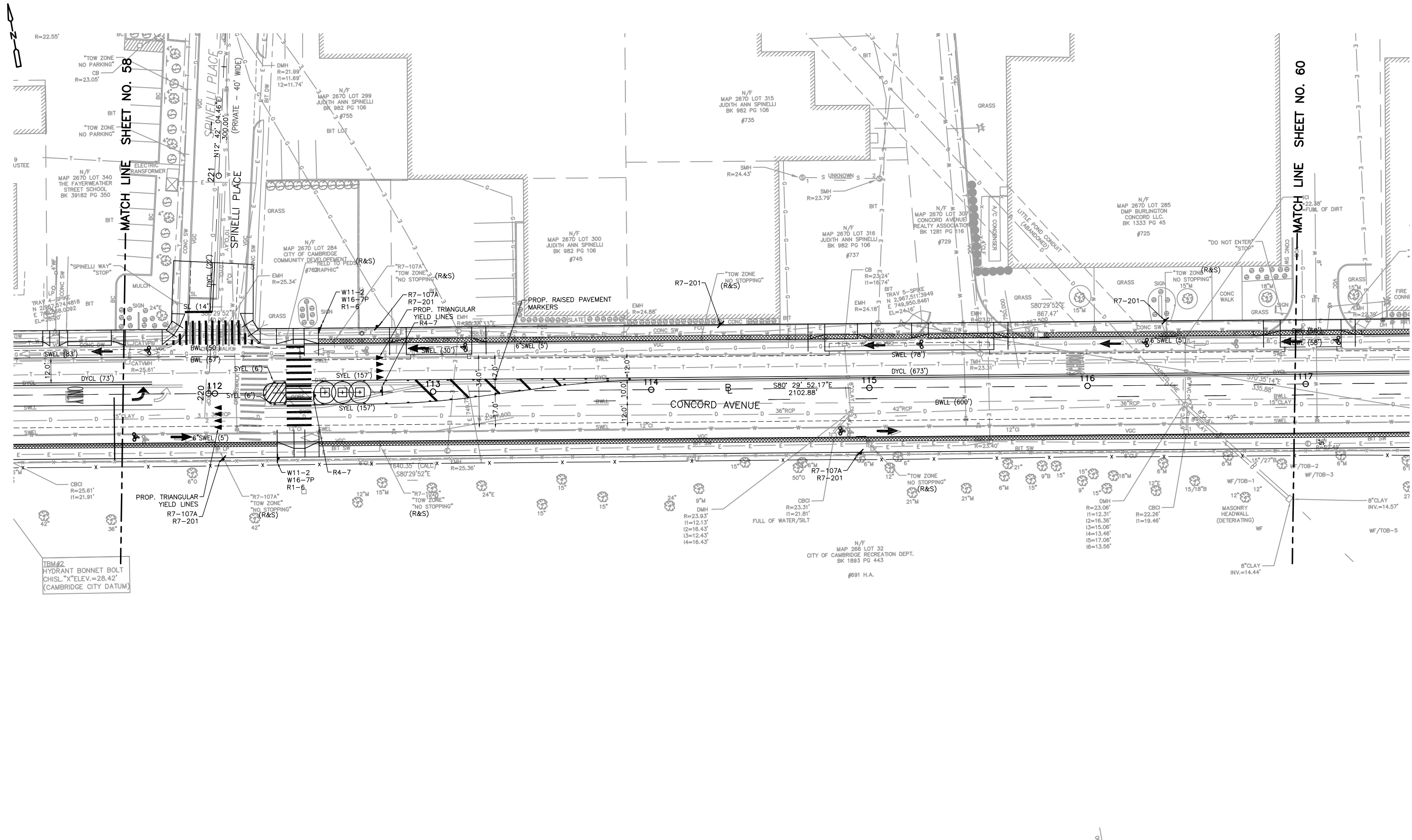
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**PAVEMENT MARKING & SIGNING PLAN**

PROJECT NO. 0139-68660  
 FILE NAME: C5TPS001

SHEET NO.  
**58**

Accession No: 0139-P-xxxx



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. MURPHY  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

**CDM**  
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 Tel: (401) 751-5360  
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CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

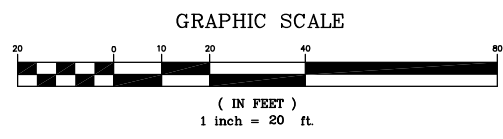
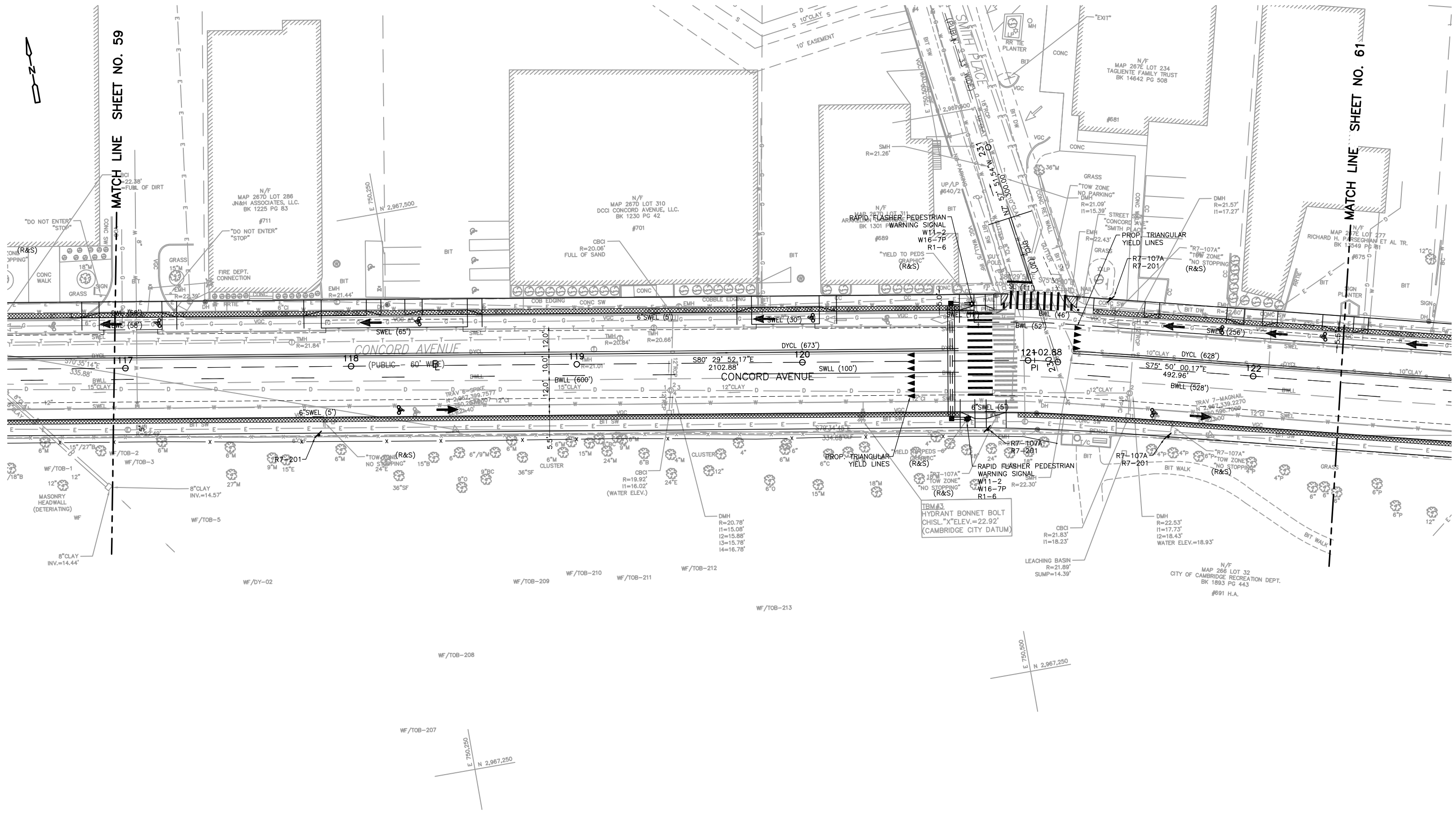
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**PAVEMENT MARKING & SIGNING PLAN**

PROJECT NO. 0139-68660  
 FILE NAME: CSTPS001

SHEET NO.  
**59**

Accession No: 0139-P-xxxx



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. MURPHY  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

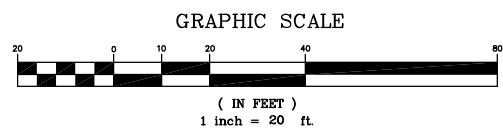
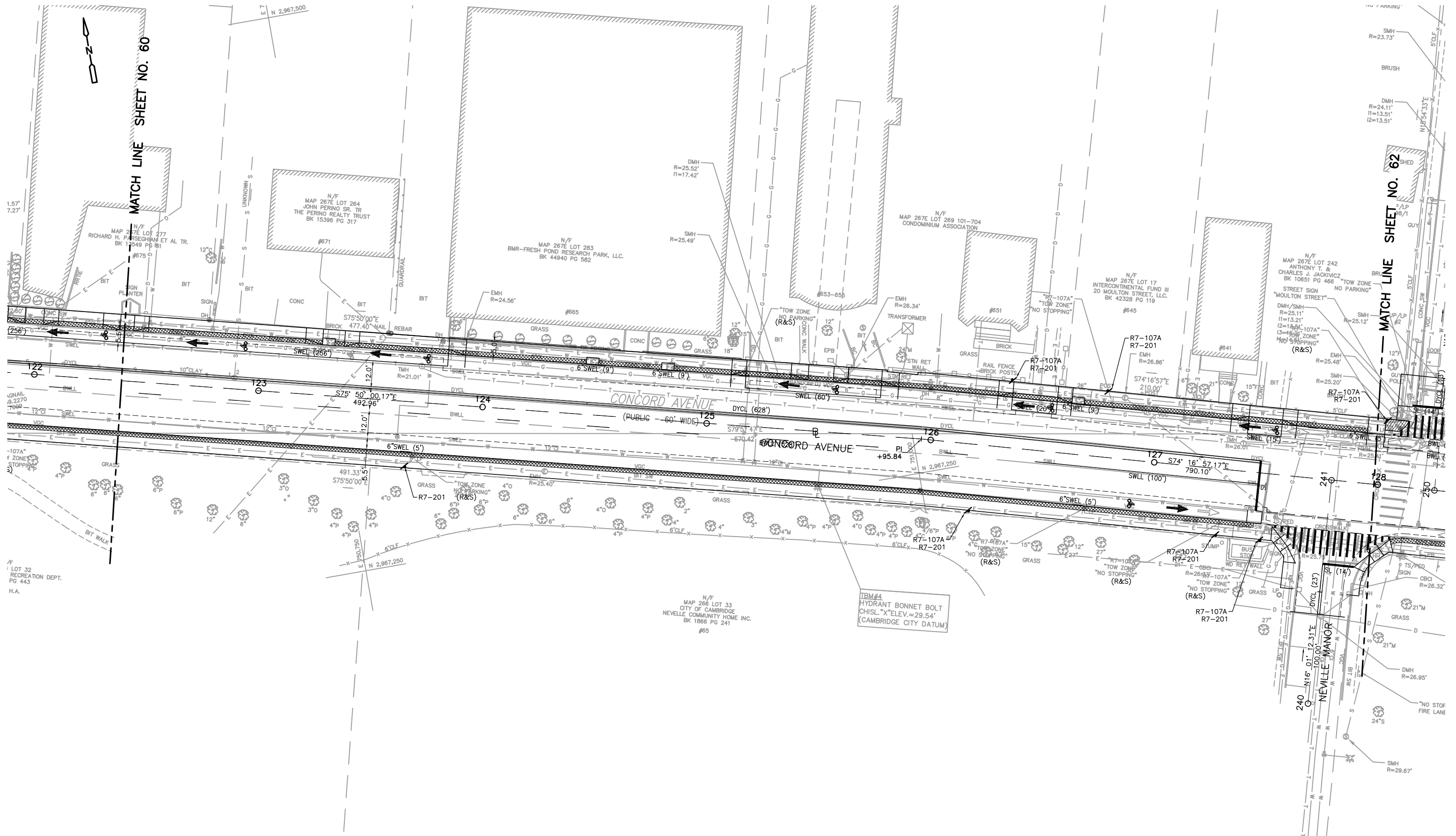
**CDM**  
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 Providence, RI 02903  
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CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**PAVEMENT MARKING & SIGNING PLAN**

PROJECT NO. 0139-68660  
 FILE NAME: C. LIGGETT  
 SHEET NO. 60  
 Accession No: 0139-P-xxxx



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. MURPHY  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

**CDM**  
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 Providence, RI 02903  
 Tel: (401) 751-5360  
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CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

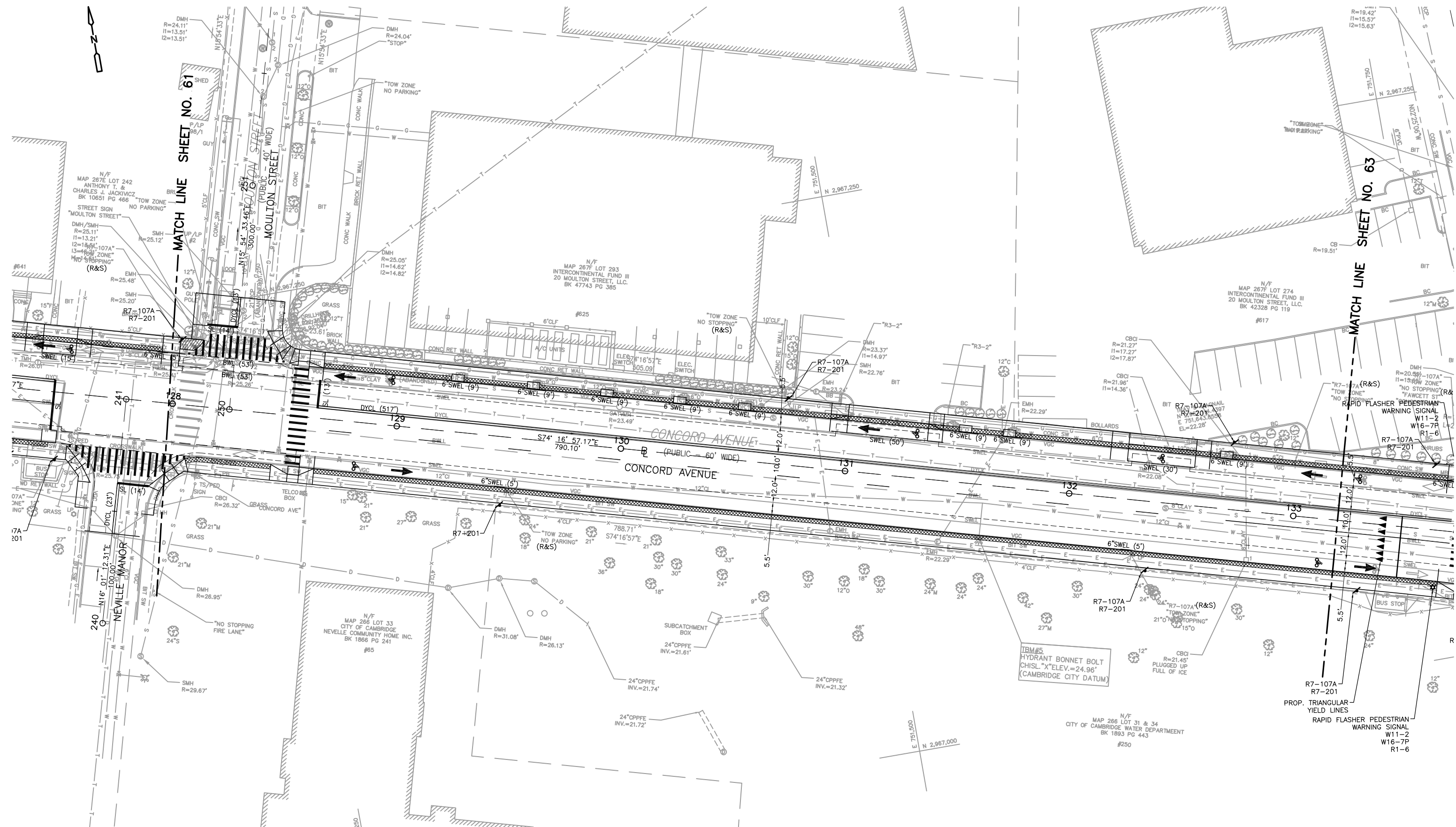
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**PAVEMENT MARKING & SIGNING PLAN**

PROJECT NO. 0139-68660  
 FILE NAME: CSTPS001

SHEET NO.  
**61**

Accession No: 0139-P-xxxx



GRAPHIC SCALE



REV. NO.	DATE	DRWN	CHKD	REMARKS

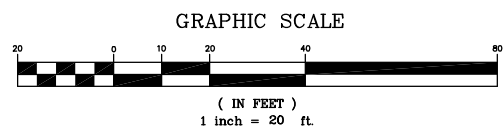
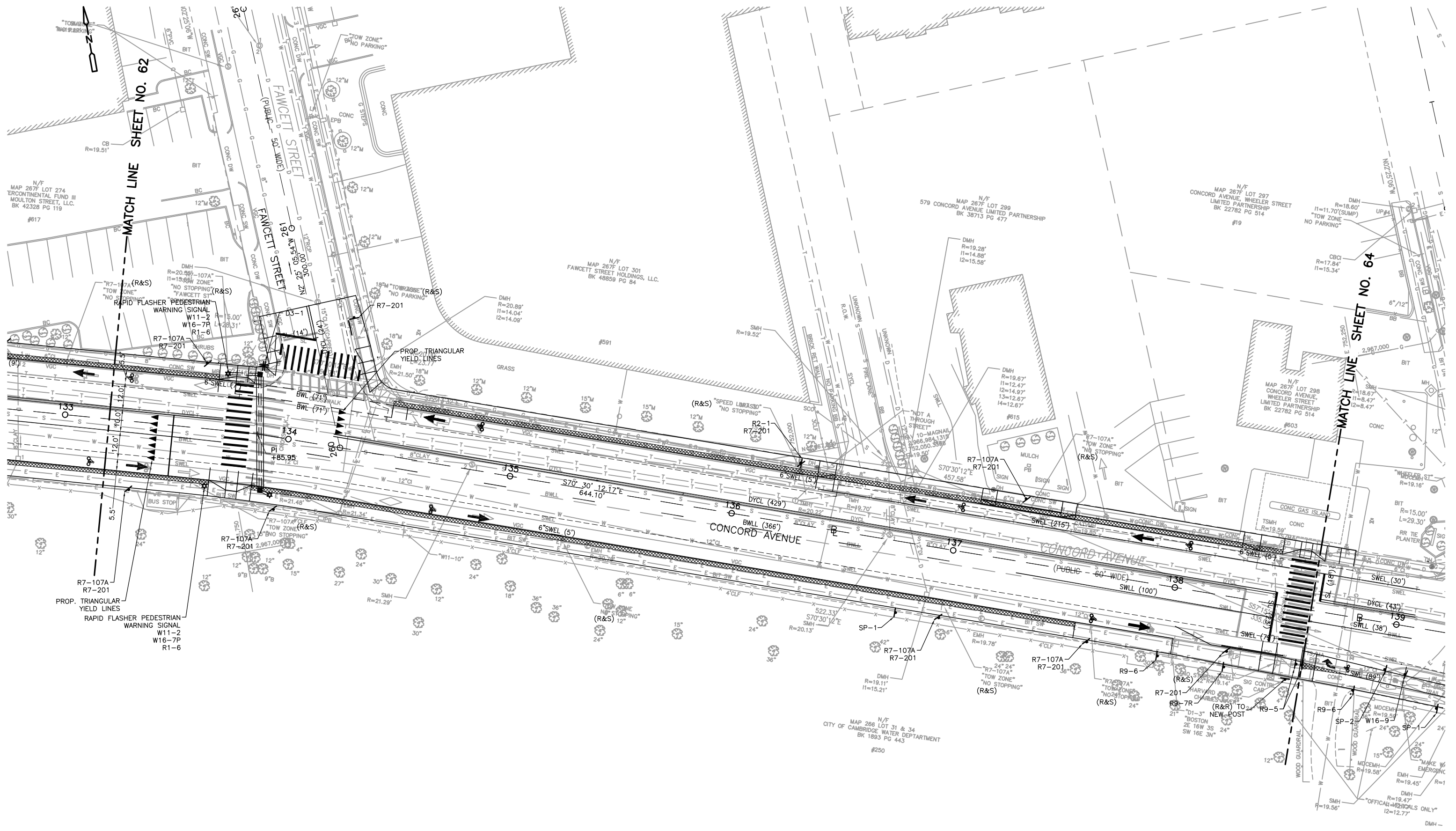
DESIGNED BY: S. MURPHY  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

**CDM**  
 56 Exchange Terrace  
 Providence, RI 02903  
 Tel: (401) 751-5360  
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CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT  
**CONCORD AVENUE**  
**WATER MAIN AND ROADWAY RECONSTRUCTION**

**PAVEMENT MARKING & SIGNING PLAN**

PROJECT NO. 0139-68660  
 FILE NAME: CSTPS001  
 SHEET NO. **62**  
 Accession No: 0139-P-xxxx



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. MURPHY  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

**CDM**  
 56 Exchange Terrace  
 Providence, RI 02903  
 Tel: (401) 751-5360  
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CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

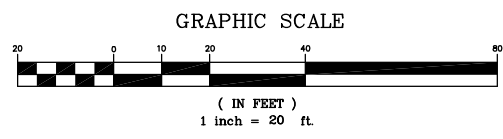
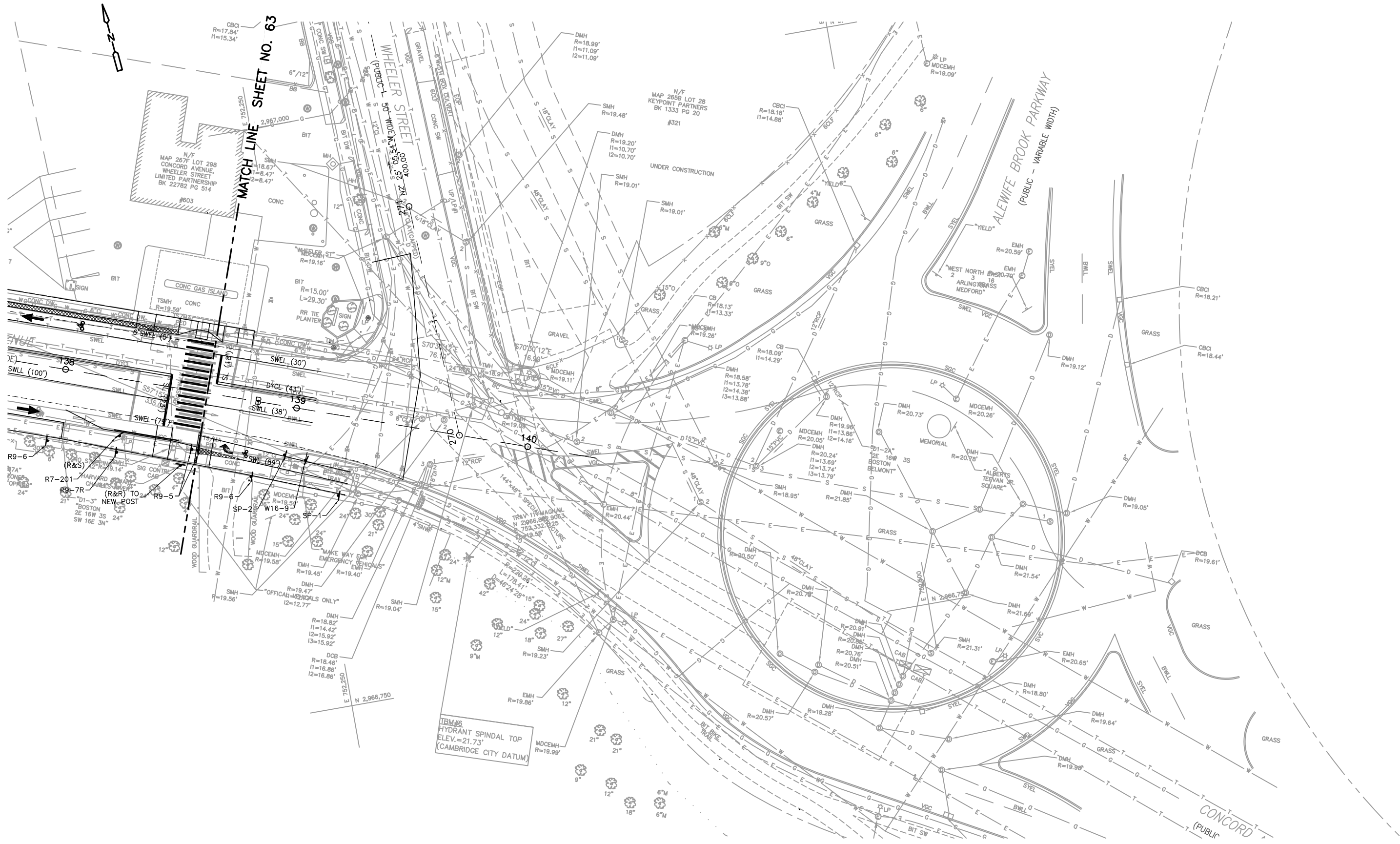
**PAVEMENT MARKING & SIGNING PLAN**

PROJECT NO. 0139-68660  
 FILE NAME: CSTPS001

SHEET NO.  
**63**

Accession No: 0139-P-xxxx





REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. MURPHY  
 DRAWN BY: S. MURPHY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: C. LIGGETT  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

**CDM**  
 56 Exchange Terrace  
 Providence, RI 02903  
 Tel: (401) 751-5360  
 consulting • engineering • construction • operations

CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

## CONCORD AVENUE WATER MAIN AND ROADWAY RECONSTRUCTION

## PAVEMENT MARKING & SIGNING PLAN

PROJECT NO. 0139-68660  
 FILE NAME: CSTPS001

SHEET NO.  
**64**

Accession No: 0139-P-xxxx

**TRAFFIC SIGN SUMMARY**

IDENTIFICATION NUMBER	SIZE OF SIGN (IN)		TEXT	TEXT DIMENSIONS (IN)		NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED	UNIT AREA (F <sup>2</sup> )	TOTAL AREA (F <sup>2</sup> )
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING		BACK-GROUND	LEGEND	BORDER			
R1-1	30	30				2				P5 (2 REQ'D)	6.25	12.50
R1-5L	18	18				2				P5 (2 REQ'D)	2.25	4.50
R1-6	12	36				6				MNT. W/ W11-2	3.00	18.00
R2-1(30)	24	30				1				MNT. W/ R7-201	5.00	5.00
R3-7R	30	30				1				P5 (1 REQ'D)	6.25	6.25
R7-201	24	12				39				P5 (39 REQ'D)	2.50	19.50
R9-5	12	18				2				MNT. ON EXISTING MAST ARM	1.50	3.00
R9-6	12	18				2				P5 (2 REQ'D)	1.50	3.00
R10-6A	24	30				1				P5 (1 REQ'D)	2.50	2.50
R10-11b	24	24				1				P5 (1 REQ'D)	4.00	4.00
W11-2	30	30				4	FLUOR. YELLOW-GREEN	BLACK	BLACK	P5 (4 REQ'D)	6.25	12.50
W16-7p	24	12				2	FLUOR. YELLOW-GREEN	BLACK	BLACK	MNT. W/ W11-2	2.00	4.00
W16-9	24	12				2				MNT. W/ W11-2	2.00	4.00
R7-107A	12	30				27				MNT. W/ R7-201	2.50	67.50
SP-1	18	18		2C 2C 2C 2C	2" 2" 2" 2"	2	FLUOR. YELLOW-GREEN	BLACK	BLACK	P5 (2 REQ'D)	2.25	2.25
SP-2	18	18				1	FLUOR. YELLOW-GREEN	BLACK	BLACK	P5 (1 REQ'D)	2.25	2.25

MUTCD STANDARD

MUTCD STANDARD

MBTA STANDARD

**TRAFFIC SIGN SUMMARY**

IDENTIFICATION NUMBER	SIZE OF SIGN (IN)		TEXT	TEXT DIMENSIONS (IN)		NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED	UNIT AREA (F <sup>2</sup> )	TOTAL AREA (F <sup>2</sup> )
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING		BACK-GROUND	LEGEND	BORDER			
R4-7	24	30				2				P5 (1 REQ'D)	5.00	10.00
R9-7L	12	18				1				P5 (1 REQ'D)	1.50	1.50
R9-7R	12	18				1				P5 (1 REQ'D)	1.50	1.50
D3-1	VAR.	12	CONCORD AVE	6C	3	7	GREEN	WHITE	WHITE	P5 (5 REQ'D) 2 MNT. W/ R1-1	VARIES	VARIES
D3-2	VAR.	12	BLANCHARD RD	6C	3	1	GREEN	WHITE	WHITE	MNT. W/ D3-1	VARIES	VARIES
D3-3	VAR.	12	GRISWOLD ST	6C	3	1	GREEN	WHITE	WHITE	MNT. W/ D3-1	VARIES	VARIES
D3-4	VAR.	12	SPINELLI PLACE	6C	3	1	GREEN	WHITE	WHITE	MNT. W/ D3-1	VARIES	VARIES
D3-5	VAR.	12	SMITH PLACE	6C	3	1	GREEN	WHITE	WHITE	MNT. W/ D3-1	VARIES	VARIES
D3-6	VAR.	12	WILSON RD	6C	3	1	GREEN	WHITE	WHITE	MNT. W/ D3-1	VARIES	VARIES
D3-7	VAR.	12	MOULTON ST	6C	3	1	GREEN	WHITE	WHITE	MNT. W/ D3-1	VARIES	VARIES
D3-8	VAR.	12	FAWCETT ST	6C	3	1	GREEN	WHITE	WHITE	MNT. W/ D3-1	VARIES	VARIES
D3-9	VAR.	12	WHEELER ST	6C	3	1	GREEN	WHITE	WHITE	MNT. W/ D3-1	VARIES	VARIES
D3-9	VAR.	12		6C	3	1	GREEN	WHITE		MNT. W/ D3-1	VARIES	VARIES

**NOTES:**

1. ALL WARNING, REGULATORY AND ROUTE MARKERS SHALL BE FABRICATED WITH HIGH INTENSITY ENCAPSULATED LENS REFLECTIVE SHEETING (SEE SECTION M9.30.0) TYPE III OR IV.
2. ALL SIGNS NOTED AS "(R&R)" SHALL BE MOUNTED ON NEW P5 POSTS OR AS OTHERWISE INDICATED.
3. ALL P5 POSTS SHALL BE BREAKAWAY TELESCOPIC RECTANGULAR TYPE POSTS AND INCLUDE POST CAPS.
4. QUANTITIES OF SIGNS AND POSTS SHOWN ON THIS SHEET MAY DIFFER FROM THE PAVEMENT MARKING AND SIGNING PLANS. WHERE DIFFERENCES OCCUR, THE PAVEMENT MARKINGS AND SIGNING PLANS SHALL PREVAIL.
5. ALL STOP AND YIELD SIGNS PROPOSED IN THIS CONTRACT ARE SUBJECT TO FIELD INVESTIGATION BY THE DISTRICT OFFICE OF THE MASSACHUSETTS HIGHWAY DEPARTMENT TO JUSTIFY WARRANTS BEFORE INSTALLATION.
6. ALL SIGN LOCATIONS (NEW & RESET) SHALL BE MARKED IN THE FIELD BY THE CONTRACTOR AND REVIEWED BY THE ENGINEER FOR SIGHT DISTANCE PRIOR TO INSTALLATION.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: A. HEALEY	 56 Exchange Terrace Providence, RI 02903 Tel: (401) 751-5360 consulting • engineering • construction • operations
DRAWN BY: A. HEALEY	
SHEET CHK'D BY: L. SHERMAN	
CROSS CHK'D BY: C. LIGGETT	
APPROVED BY: L. SHERMAN	
DATE: JANUARY 2010	

CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**SIGN SUMMARY**

PROJECT NO. 0139-68660
FILE NAME: CSTSS001
SHEET NO. 65
Accession No: 0139-P-xxxx

**TRAFFIC MANAGEMENT NOTES:**

**GENERAL:**

- ALL TEMPORARY TRAFFIC CONTROL WORK SHALL CONFORM TO THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD), ITS REVISIONS, AND THE CITY OF CAMBRIDGE STANDARD.
- THE TRAFFIC MANAGEMENT PLANS CONTAINED HEREIN ARE GIVEN AS A GUIDE FOR TYPICAL WORK ZONE TRAFFIC CONTROL APPLICATIONS FOR THE TYPES OF WORK ANTICIPATED FOR THIS PROJECT. THEY ARE NOT INTENDED TO COVER ALL POSSIBLE CONSTRUCTION OPERATIONS WHICH THE CONTRACTOR MAY CHOOSE TO EMPLOY. WORK ZONE TRAFFIC CONTROL FOR OTHER CONSTRUCTION OPERATIONS OR OTHER TRAFFIC SITUATIONS IF APPLICABLE SHALL BE IN ACCORDANCE WITH THE M.U.T.C.D. AND AS APPROVED OR REQUIRED BY THE ENGINEER. THE CONTRACTOR SHALL SUBMIT ALTERNATE TRAFFIC CONTROL PLANS FOR APPROVAL WHEN NECESSARY.
- TEMPORARY CONSTRUCTION SIGNING AND ALL OTHER TRAFFIC CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF ANY WORK.
- ALL TEMPORARY SIGNAGE AND TRAFFIC CONTROL DEVICES SHALL BE PROPERLY SECURED.
- TEMPORARY CONSTRUCTION SIGNING, BARRICADES AND ALL OTHER NECESSARY WORK ZONE TRAFFIC CONTROL DEVICES SHALL BE REMOVED FROM THE HIGHWAY OR COVERED WHEN THEY ARE NOT REQUIRED FOR CONTROL OF TRAFFIC.
- SIGNS AND SIGN SUPPORTS LOCATED ON OR NEAR THE TRAVELED WAY, AND REFLECTORIZED PLASTIC DRUMS WITH LIGHTING DEVICES MOUNTED ON THEM, MUST PASS THE CRITERIA SET FORTH IN NCHRP REPORT 350, "RECOMMENDED PROCEDURES FOR THE SAFETY PERFORMANCE EVALUATION OF HIGHWAY FEATURES."
- CONTRACTOR SHALL MAINTAIN ABUTTER ACCESS AT ALL TIMES EXCEPT FOR VERY SHORT PERIODS APPROVED BY THE ENGINEER. EACH ABUTTER SHALL BE NOTIFIED BY THE CONTRACTOR AT LEAST 48 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OF ACCESS.
- ALL TRAFFIC CONTROL DEVICES SHALL BE PLACED AND MOVED AS NECESSARY TO MAINTAIN ADEQUATE ABUTTER ACCESS AT ALL TIMES. WORK MAY REQUIRE ADDITIONAL SIGNAGE AND OTHER TRAFFIC CONTROL DEVICES, GRADING, AND TEMPORARY PAVEMENT FOR PASSAGE OF PEDESTRIAN, VEHICULAR, AND EMERGENCY TRAFFIC THROUGH WORK AREAS BOTH DURING AND AFTER WORK HOURS.
- ALL TRAVEL WAYS SHALL BE PROTECTED FROM DUST AND CONSTRUCTION DEBRIS AT ALL TIMES.
- TRAFFIC CONTROL INCLUDES NECESSARY STREET SWEEPING AND SNOW REMOVAL WITHIN THE WORK ZONE.
- THE FIRST THREE PLASTIC DRUMS OF A TAPER MAY BE MOUNTED WITH TYPE A LIGHTS.
- ADVISORY SPEED LIMITS SHALL BE POSTED AS DIRECTED BY THE CITY.
- ALL DRUMS NOT OTHERWISE SPECIFIED SHALL BE EQUIPPED WITH TYPE "C" - STEADY BURN WARNING LIGHTS.
- MAXIMUM SPACING OF TRAFFIC DEVICES IN A TAPER (DRUMS OR CONES) IS EQUAL IN FEET TO THE SPEED LIMIT IN MPH.
- ONE TRAVEL LANE (MINIMUM 11 FEET) IN EACH DIRECTION SHALL BE MAINTAINED AT ALL TIMES ON CONCORD AVENUE UNLESS OTHERWISE REQUIRED BY THE ENGINEER.
- VEHICULAR AND PEDESTRIAN SHALL BE ALLOWED ACCESS TO PRIVATE PROPERTY AT ALL TIMES DURING CONSTRUCTION.
- CONSTRUCTION WORK ZONE SHALL BE STAGED AS TO ALLOW FOR CONTINUOUS ACCESS AT DRIVE ENTRANCES AND TO MINIMIZE DETOURS TO CAMBRIDGE ROADS.
- SAFE PEDESTRIAN WALKWAYS SHALL BE PROVIDED AND ACCESS TO LOCAL BUSINESSES AND RESIDENCES. PUBLIC WALKWAYS SHALL REMAIN OPEN AND ACCESSIBLE ACCORDANCE WITH AAB REGULATIONS UNLESS OTHERWISE DIRECTED BY THE CITY.
- ALL EXISTING PEDESTRIAN CROSSINGS SHALL BE MAINTAINED. ALTERNATIVE CROSSING SHALL BE PROVIDED WHEN EXISTING CROSSINGS ARE DISRUPTED BY CONSTRUCTION ACTIVITY. TEMPORARY LOCATIONS, SAFETY SIGNAGE, AND SAFETY CONTROLS SHALL BE APPROVED BY THE CITY PRIOR TO IMPLEMENTATION.
- ROADWAY FLAGGERS SHALL NOT BE USED ON THIS PROJECT. POLICE OFFICER DETAILS SHALL BE USED ACCORDINGLY IN CONFORMANCE WITH THE MUTCD. POLICE DETAILS SHALL BE SCHEDULED AND COORDINATED BY THE CONTRACTOR TO MAINTAIN THE SAFETY OF PEDESTRIAN AND VEHICULAR TRAFFIC.
- DETOURS SHALL ONLY BE ALLOWED AS INDICATED OR AS APPROVED BY THE CITY OF CAMBRIDGE TRAFFIC AND PARKING DEPARTMENT.
- ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD SIGN SUPPORTS.
- NIGHT WORK OPERATIONS SHALL INCLUDE PROPERLY LIT & PLACED LUMINAIRES MEETING THE REQUIREMENTS OF THE MUTCD AND THE CITY OF CAMBRIDGE.
- FLASHING ARROW PANEL SHALL BE SET IN "ARROW MODE" WHEN USED FOR ACTUAL LANE OR PARTIAL LANE CLOSURES ONLY. FOR SHOULDER CLOSURES, BULBS TO BE ILLUMINATED IN A NON-DIRECTIONAL CAUTION CONFIGURATION TO AVOID UNNECESSARY LANE SHIFTS.
- FLASHING ARROW BOARDS SHALL BE UTILIZED FOR LANE SHIFTS WHERE THE EXISTING SPEED IS 35 MPH OR GREATER.
- ALL WORK ZONE AREAS SHOULD BE PROTECTED APPROPRIATELY. ALL EXPOSED TRENCHES SHOULD BE STEEL PLATED OR BACK FILLED WHEN NO WORK IS UNDERWAY/PERFORMED AND APPROPRIATELY SIGNED.
- ADDITIONAL TRAFFIC CONTROL DEVICES SHALL BE PROVIDED UPON THE CITY'S REQUEST.
- ALL SIGN LOCATIONS ON DETAILS ARE SHOWN SCHEMATICALLY. FINAL LOCATIONS SHALL BE DETERMINED BASED ON ACTUAL FIELD CONDITIONS AND CITY APPROVAL.
- ALL TEMPORARY SETUPS SHALL BE ADA/AAB COMPLIANT AND SHALL ACCOMMODATE PEDESTRIANS AND BICYCLISTS.

**GRADE DIFFERENCES:**

- WHERE THERE IS A LONGITUDINAL DIFFERENCE IN ELEVATION BETWEEN THE EXISTING PAVEMENT AND COLD PLANNED OR NEW PAVEMENT, THE CONTRACTOR SHALL PATCH A TEMPORARY HOT MIX ASPHALT WEDGE WITH A 12:1 (OR FLATTER) SLOPE FOR SMOOTH TRANSITION. SEE TRAFFIC MANAGEMENT PLAN 2.
- GRADE SEPARATIONS IN EXCESS OF 2" DURING NON-WORKING HOURS WILL REQUIRE DELINEATION BY USE OF REFLECTORIZED DRUMS.
- EXCAVATION EDGES IN EXCESS OF 4" DEEP SHALL BE PROTECTED DURING NON-WORKING HOURS BY BACKFILLING WITH A WEDGE OF GRAVEL COMPACTED TO A 4:1 SLOPE.
- A MINIMUM SLOPE OF 4:1 MUST BE MAINTAINED AFTER WORKING HOURS DURING SUBBASE AND BASE COURSE INSTALLATION ALONG EDGE OF THE TRAVELWAY (SEE DETAIL, THIS SHEET). A MINIMUM SLOPE OF 8:1 MUST BE MAINTAINED ON ALL ABUTTED ACCESS DRIVES AND A MINIMUM SLOPE OF 12:1 MUST BE MAINTAINED ON ALL SIDEWALKS.

**CONSTRUCTION SIGNING:**

- THE FIRST CONSTRUCTION SIGN IN A SERIES ON EACH APPROACH TO THE PROJECT SHALL BE FLUORESCENT ORANGE, HIGH PERFORMANCE (OR HIGH DENSITY) SHEETING. FLAGS MAY BE MOUNTED WITH THE FIRST SIGN.
- ALL CONSTRUCTION SIGNS SHALL BE BLACK LEGEND ON A REFLECTORIZED ORANGE BACKGROUND UNLESS OTHERWISE NOTED AND SHALL CONFORM TO THE MUTCD.

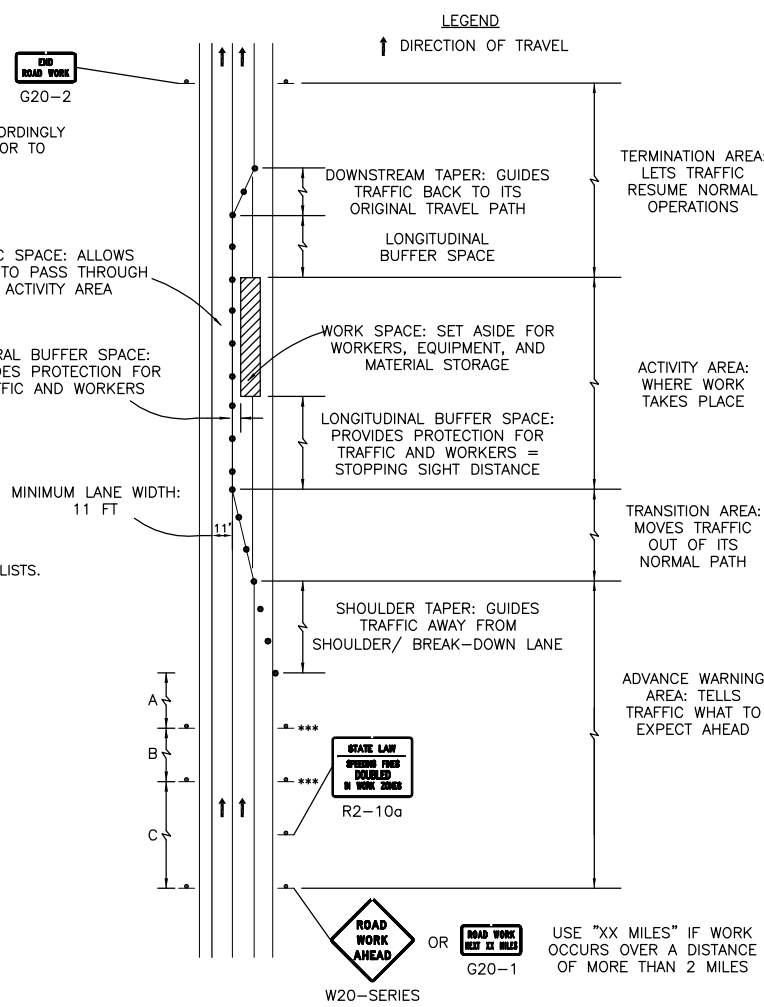
- EXISTING GUIDE SIGNS SHALL BE TEMPORARILY RESET AS REQUIRED BY THE ENGINEER.
- ALL SIGNS, INCLUDING EXISTING, THAT ARE NOT REPRESENTATIVE OF ACTUAL WORK CONDITIONS SHALL BE EITHER COVERED OR REMOVED WHEN NOT APPLICABLE.
- IF USED, W20-4 AND W20-5 SIGNS SHALL BE TAKEN DOWN OR COVERED AT THE CLOSE OF EACH WORK DAY.
- USE W20-8 SIGNS ONLY WHILE POLICE ARE DIRECTING TRAFFIC. THEY SHALL BE TAKEN DOWN OR COVERED AT THE CLOSE OF EACH WORK DAY.
- SIGNS MUST BE PROFESSIONALLY LETTERED. NO HANDWRITTEN/PAINTED SIGNS SHALL BE ALLOWED.
- WHERE LANE SHIFTS, WORK ZONES, OR OTHER CONSTRUCTION ACTIVITIES INFRINGE UPON ON-STREET PARKING AREAS, THE CONTRACTOR SHALL INSTALL TEMPORARY 'NO PARKING/TOW AWAY ZONE' SIGNS (R8-3/R7-201a) AS APPROPRIATE AT LEAST 48 HOURS IN ADVANCE (LOG POSTING DATE AND TIME). THE R8-3/R7-201a SIGNS SHALL BE TAKEN DOWN OR COVERED AT THE CLOSE OF EACH DAY UNLESS PARKING RESTRICTIONS ARE PERMITTED TO REMAIN OVERNIGHT AS REQUIRED BY THE ENGINEER.
- IF USED, PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS) SHALL CONFORM TO THE 2003 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D.) AS AMENDED AND SHOULD BE PLACED ON THE SHOULDER OF THE ROADWAY OR IF PRACTICAL SET WELL AWAY FROM THE TRAVEL LANE. MESSAGE SIGNS SHOULD BE PROTECTED WITH RETROREFLECTIVE TEMPORARY TRAFFIC CONTROL DEVICES WHEN PLACED WITHIN THE AVAILABLE CLEAR ZONE OR ELSE SHIELDED WITH A BARRIER OR CRASH CUSHION. THE LOCATION AND USE OF THE PCMS SHALL BE DETERMINED DURING THE PRE-CONSTRUCTION MEETING OR AS DIRECTED BY THE ENGINEER IN THE FIELD.

**PAVEMENT MARKINGS:**

- PAVEMENT MARKINGS WHICH ARE NO LONGER APPLICABLE SHALL BE REMOVED. APPLY TEMPORARY MARKINGS WHERE SHOWN ON THE TRAFFIC MANAGEMENT PLANS AND AS REQUIRED BY THE ENGINEER.
- ON PROJECTS WHERE PAVEMENT OVERLAY IS NOT DESIGNATED, EXISTING PAVEMENT MARKINGS WHICH ARE IN CONFLICT WITH TEMPORARY TRAFFIC CONTROLS SHOULD BE COVERED TEMPORARILY WITH BLACKOUT TAPE, AS REQUIRED BY THE ENGINEER. FOR THE FULL DURATION OF THE PHASE IN PROGRESS, TEMPORARY PAINTED OR REMOVABLE TAPE MARKINGS SHALL BE USED AS NECESSARY FOR ALL PHASES OF CONSTRUCTION.

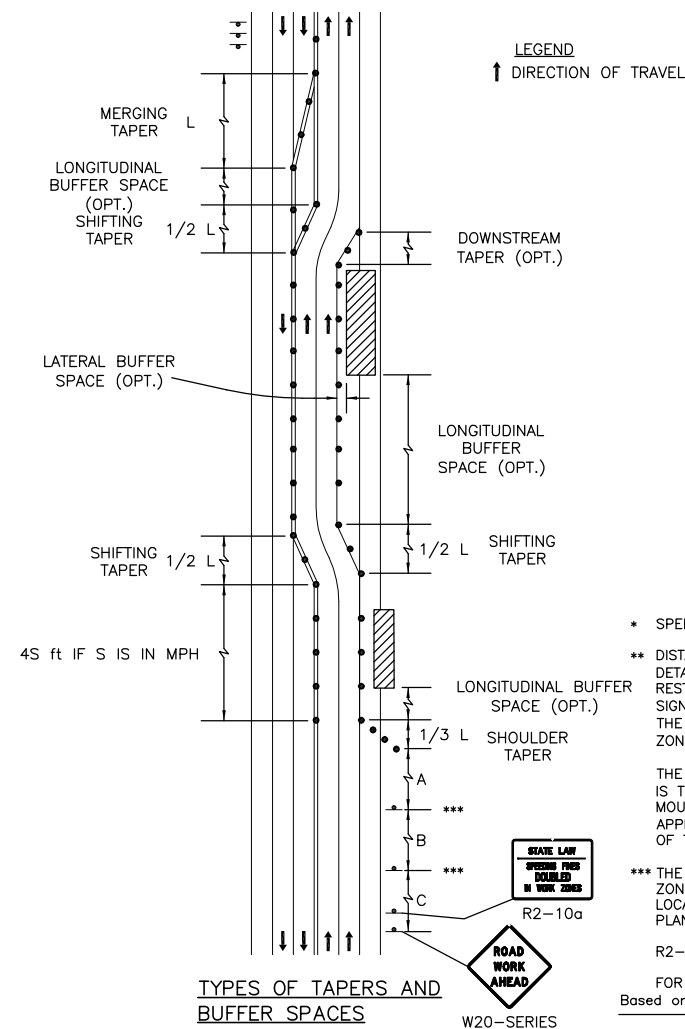
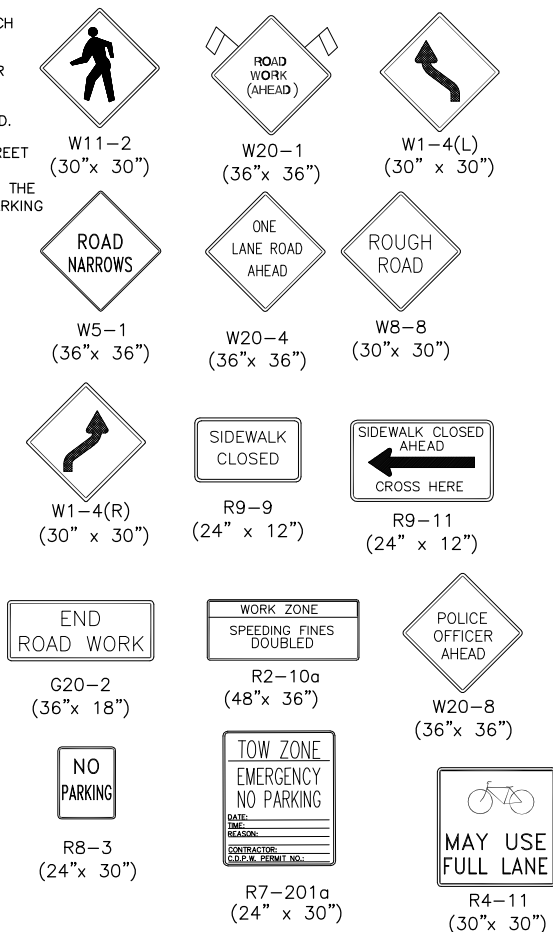
**LEGEND:**

- REFLECTORIZED PLASTIC DRUM
- POLICE DETAIL
- TYPE III BARRICADE
- FLASHING ARROW PANEL
- FLASHING ARROW BOARD
- PORTABLE CHANGEABLE MESSAGE SIGN
- LUMINAIRE
- WORK ZONE
- DIRECTION OF TRAFFIC
- IMPACT ATTENUATOR
- MEDIAN BARRIER
- MEDIAN BARRIER WITH WARNING LIGHTS
- WORK VEHICLE
- TRUCK MOUNTED ATTENUATOR
- TRAFFIC OR PEDESTRIAN SIGNAL
- SIGN



**COMPONENT PARTS OF A TEMPORARY TRAFFIC CONTROL ZONE**

**SIGN LEGEND**



**TYPES OF TAPERS AND BUFFER SPACES**

**PORTABLE CHANGEABLE MESSAGE SIGNS LEGEND**

THE SUGGESTED MESSAGE 2 WEEKS IN ADVANCE:

- ① CONCORD AVENUE ROAD WORK
- ② BEGINS X/XX/XX

**FORMULAS FOR DETERMINING TAPER LENGTHS**

Speed Limit (S)	Taper Length (L) Feet
40 MPH OR LESS	$L = \frac{WS^2}{60}$
45 MPH OR MORE	$L = WS$

WHERE: L = TAPER LENGTH IN FEET  
 W = WIDTH OF OFFSET IN FEET  
 S = POSTED SPEED LIMIT, OR OFF-PEAK 85TH-PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED IN MPH

Source: Table 6C-4 2003 MUTCD

**TAPER LENGTH CRITERIA FOR TEMPORARY TRAFFIC CONTROL ZONES**

Type of Taper	Taper Length (L)*
MERGING TAPER	AT LEAST L
SHIFTING TAPER	AT LEAST 0.5L
SHOULDER TAPER	AT LEAST 0.33L
ONE-LANE, TWO-WAY TRAFFIC TAPER	100 FT MAXIMUM
DOWNSTREAM TAPER	100 FT PER LANE

Source: Table 6C-3 2003 MUTCD

**STOPPING SIGHT DISTANCE AS A FUNCTION OF SPEED**

SPEED* (mph)	DISTANCE (ft)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

\*POSTED SPEED, OFF-PEAK 85TH-PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED

THESE VALUES MAY BE USED TO DETERMINE THE LENGTH OF LONGITUDINAL BUFFER SPACES.

THE DISTANCES IN THE ABOVE CHART REPRESENT THE MINIMAL VALUES FOR BUFFER SPACING.

Source: Table 6C-2 2003 MUTCD  
**SUGGESTED WORK ZONE WARNING SIGN SPACING**

Road Type	Distance Between Signs**		
	A	B	C
LOCAL OR LOW VOLUME ROADWAYS*	350	350	350
MOST OTHER ROADWAYS*	500	500	500
FREEWAYS AND EXPRESSWAYS*	1,000	1,500	2,640

\* SPEED CATEGORY TO BE DETERMINED BY MASSHIGHWAY.

\*\* DISTANCES ARE SHOWN IN FEET. THE COLUMN HEADINGS A, B, AND C ARE THE DIMENSIONS SHOWN IN THE DETAIL/ TYPICAL SETUP FIGURES. THE A DIMENSION IS THE DISTANCE FROM THE TRANSITION OR POINT OF RESTRICTION TO THE FIRST SIGN. THE B DIMENSION IS THE DISTANCE BETWEEN THE FIRST AND SECOND SIGNS. THE C DIMENSION IS THE DISTANCE BETWEEN THE SECOND AND THIRD SIGNS. (THE "THIRD" SIGN IS THE FIRST ONE TYPICALLY ENCOUNTERED BY A DRIVER APPROACHING A TEMPORARY TRAFFIC CONTROL (TTC) ZONE.)

THE "THIRD" SIGN ABOVE IS REFERRED TO AS THE INITIAL ADVANCE WARNING SIGN ON THE TMP SETUPS. IT IS THE ONE WHICH MAY OFTEN HAVE THE "STANDARD RED OR RED-ORANGE FLAGS (16 in. x 16 in.)" MOUNTED ON IT. THESE INITIAL ADVANCE WARNING SIGNS ARE LOCATED AT THE PROJECT LIMITS ON ALL APPROACHES (I.E. THE W20-1 SERIES (ROAD WORK XX FT) SIGNS), AND USUALLY REMAIN FOR THE DURATION OF THE PROJECT.

\*\*\* THE FIRST AND SECOND WARNING SIGNS ABOVE ARE REFERRED TO AS THE OPERATIONAL (DAY-TO-DAY) WORK ZONE SIGNS AND MAY BE MOVED DEPENDING ON WHERE THE SPECIFIC ROADWAY WORK FOR THAT DAY IS LOCATED. REFER TO DETAILS SHOW ON TRAFFIC MANAGEMENT PLANS I AND II AND TO THE ADVANCE WARNING PLAN ON TRAFFIC MANAGEMENT PLAN III.

R2-10a SIGNS SHALL BE PLACED BETWEEN THE SECOND AND THIRD SIGNS.

FOR R2-10a, W20-1 AND G20-2 SERIES SIGNS SEE ADVANCE WARNING SIGN SETUP.  
 Based on: Table 6C-1 2003 MUTCD

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: A. HEALEY  
 DRAWN BY: A. HEALEY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

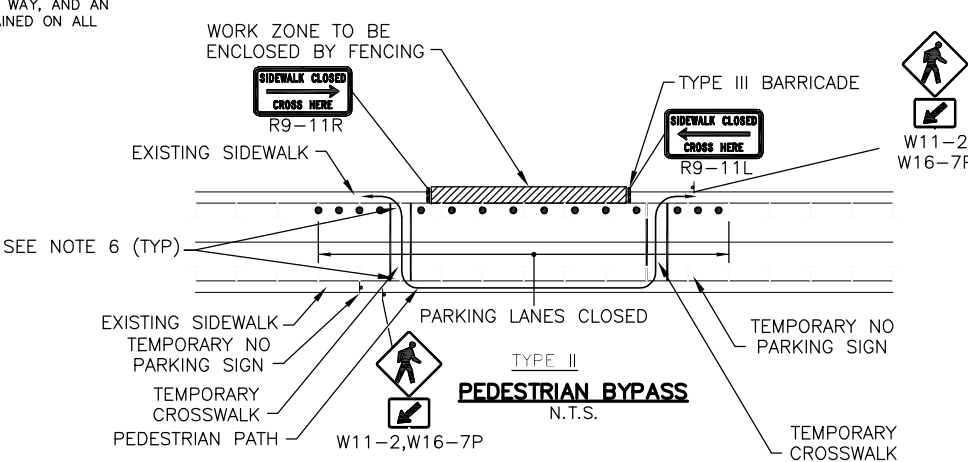
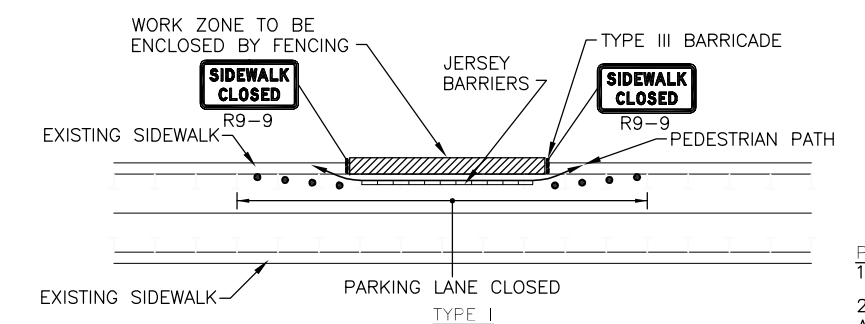
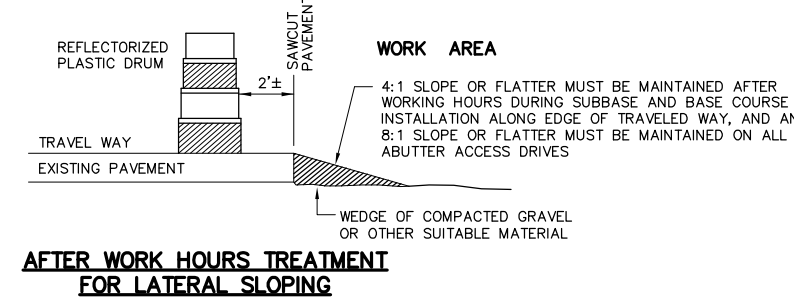
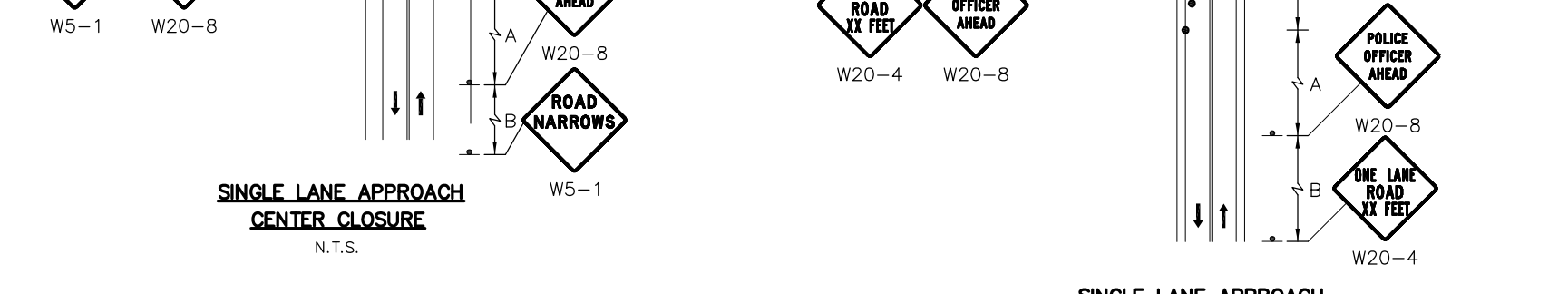
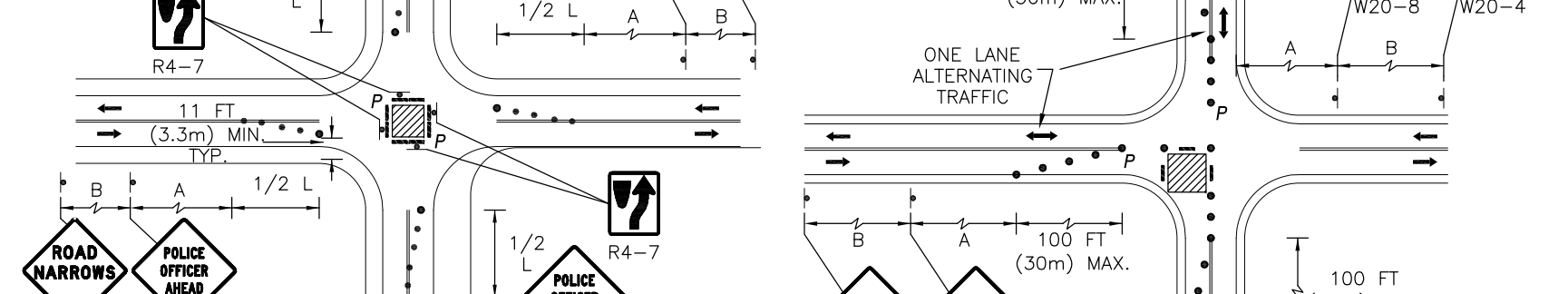
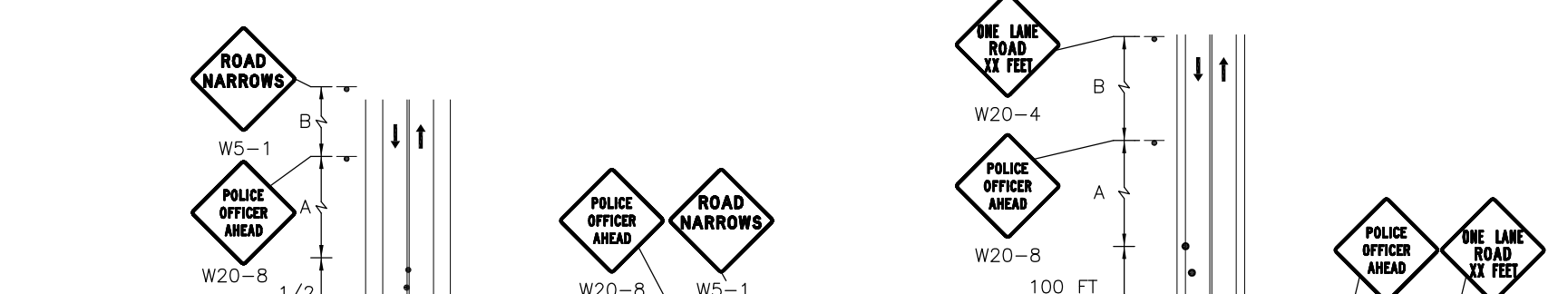
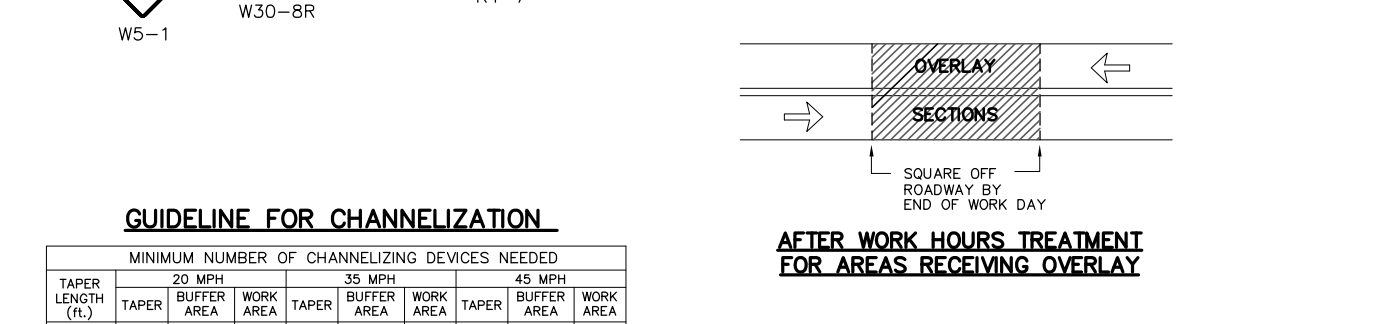
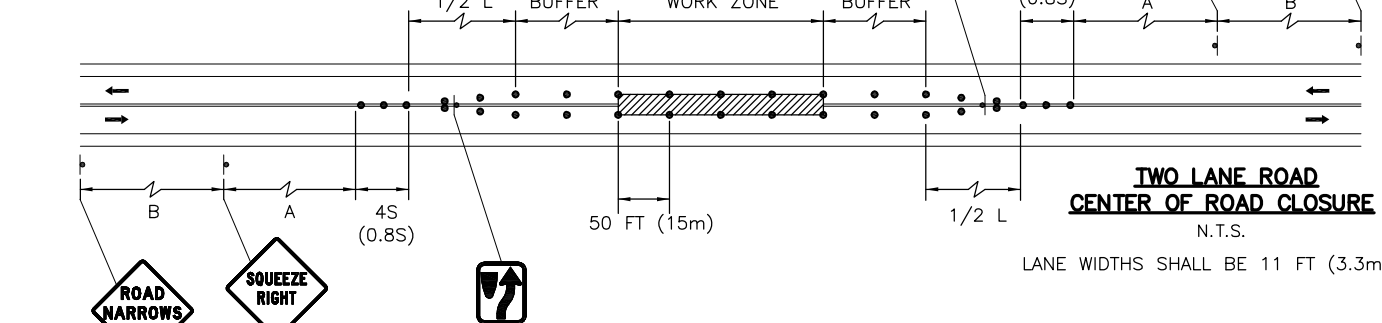
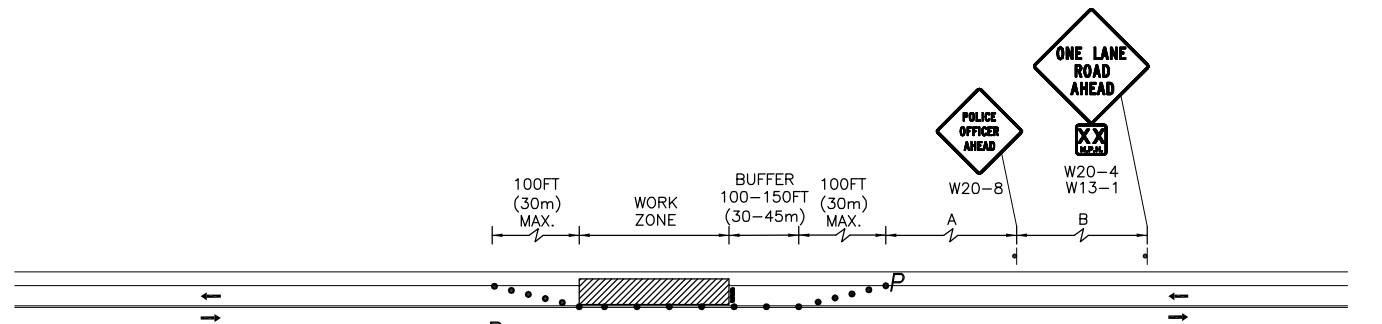
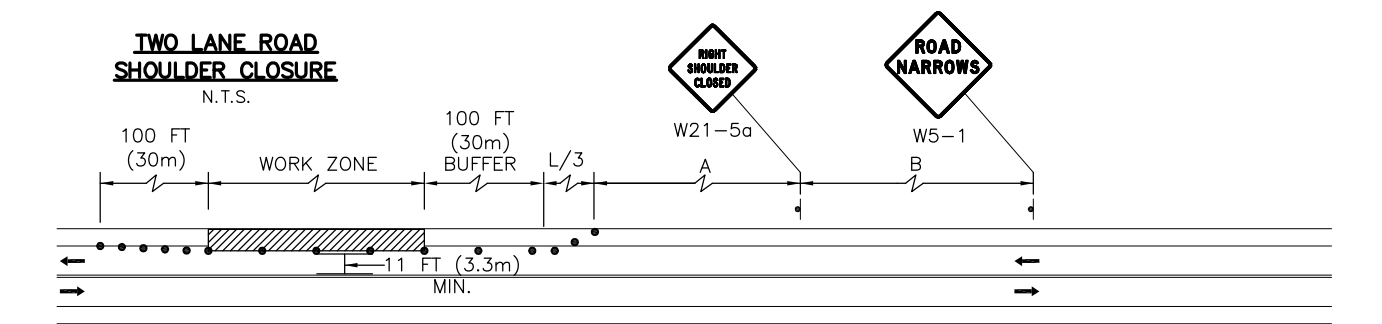
**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**TRAFFIC MANAGEMENT PLAN I**

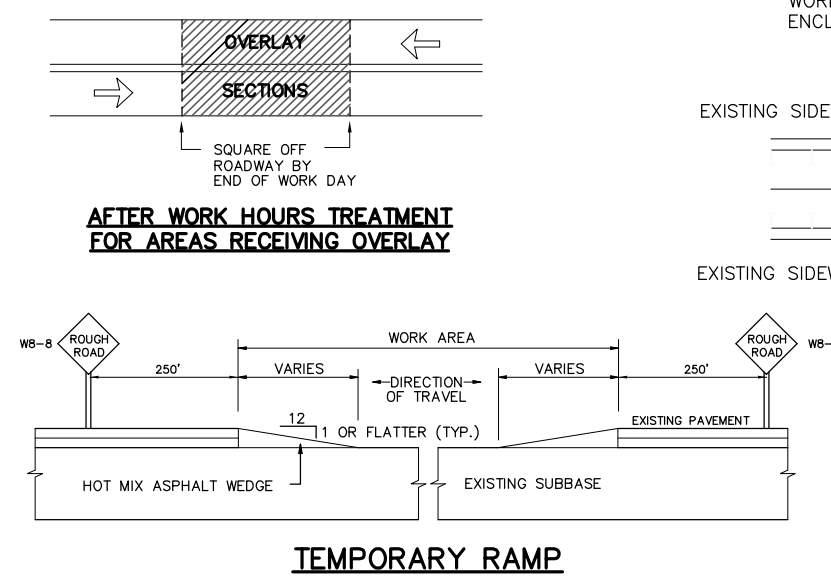
PROJECT NO. 0139-68660  
 FILE NAME: CSTM001

SHEET NO.  
**66**

Accession No: 0139-P-xxxx



- PEDESTRIAN BYPASS NOTES**
- ADDITIONAL ADVANCE WARNING MAY BE NECESSARY.
  - CONTROLS ONLY FOR PEDESTRIAN TRAFFIC ARE SHOWN. VEHICULAR TRAFFIC SHOULD BE HANDLED AS SHOWN ELSEWHERE.
  - STREET LIGHTING SHOULD BE CONSIDERED WHEN LOCATING CONTROL DEVICES.
  - IF THE WORK ZONE DOES NOT PERMIT PEDESTRIANS TO TRAVEL ADJACENT TO IT AS SHOWN IN PEDESTRIAN BYPASS TYPE I, TEMPORARY CROSSWALKS WITH APPROPRIATE SIGNS SHOULD BE INSTALLED TO CROSS PEDESTRIANS TO THE OPPOSITE SIDE OF THE STREET AS SHOWN IN PEDESTRIAN BYPASS TYPE II, AND AS DIRECTED BY THE ENGINEER.
  - BYPASS IS TO BE USED IN CONJUNCTION WITH THE PROPOSED LANE CLOSURE DETAILS AND DURING CONSTRUCTION STAGING, AS DIRECTED BY THE ENGINEER.
  - CONTRACTOR SHALL PROVIDE TEMPORARY ASPHALT PEDESTRIAN RAMPS FOR THE TRANSITION BETWEEN THE SIDEWALK AND ROADWAY. THESE RAMPS SHALL BE IN ACCORDANCE WITH THE AMERICANS WITH DISABILITIES ACT AND ARE TO BE APPROVED BY THE ENGINEER.



**GUIDELINE FOR CHANNELIZATION**

TAPER LENGTH (ft.)	20 MPH			35 MPH			45 MPH		
	TAPER	BUFFER AREA	WORK AREA	TAPER	BUFFER AREA	WORK AREA	TAPER	BUFFER AREA	WORK AREA
100	5	3	ONE	5	3	ONE	5	3	ONE
150	8	4	ONE	6	4	ONE	6	4	ONE
200	10	5	ONE	7	5	ONE	7	5	ONE
250	12	6	ONE	9	6	ONE	8	4	DRUM
300	15	7	ONE	10	7	ONE	10	6	ONE
350	18	9	ONE	11	8	ONE	11	6	ONE
400	20	10	ONE	13	7	ONE	10	6	ONE
450	22	11	ONE	14	7	ONE	11	6	ONE
500	25	12	ONE	16	8	ONE	13	7	ONE
550	27	13	ONE	17	8	ONE	14	7	ONE
600	30	15	ONE	19	10	ONE	15	9	ONE
650	32	16	ONE	20	10	ONE	16	9	ONE

NOTE: MINIMUM SPACING OF DRUMS MAY VARY AND SHALL BE DETERMINED IN THE FIELD.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: A. HEALEY  
DRAWN BY: A. HEALEY  
SHEET CHK'D BY: C. LIGGETT  
CROSS CHK'D BY: L. SHERMAN  
APPROVED BY: L. SHERMAN  
DATE: JANUARY 2010

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CITY OF CAMBRIDGE, MASSACHUSETTS  
DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

**CONCORD AVENUE**  
**WATER MAIN AND ROADWAY RECONSTRUCTION**

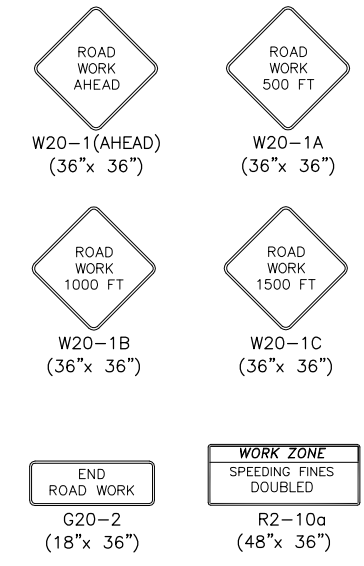
**TRAFFIC MANAGEMENT PLAN II**

PROJECT NO. 0139-68660  
FILE NAME: CSTM001

SHEET NO. **67**  
Accession No: 0139-P-xxxx



**SIGN SUMMARY**



**ADVANCE WARNING SIGN PLAN**  
1"=300'

REV. NO.	DATE	DRWN	CHKD	REMARKS

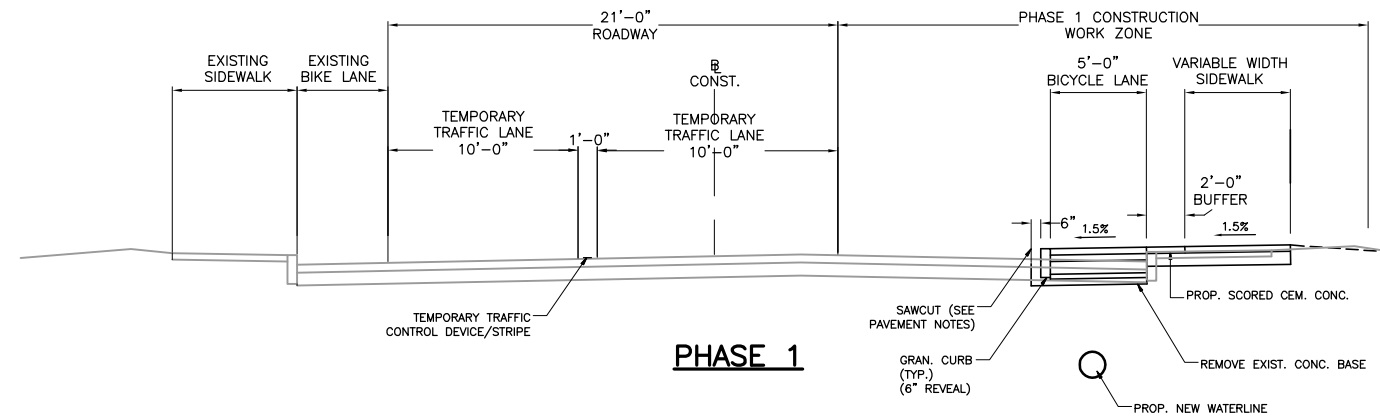
DESIGNED BY: A. HEALEY  
 DRAWN BY: A. HEALEY  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
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**CONCORD AVENUE**  
**WATER MAIN AND ROADWAY RECONSTRUCTION**

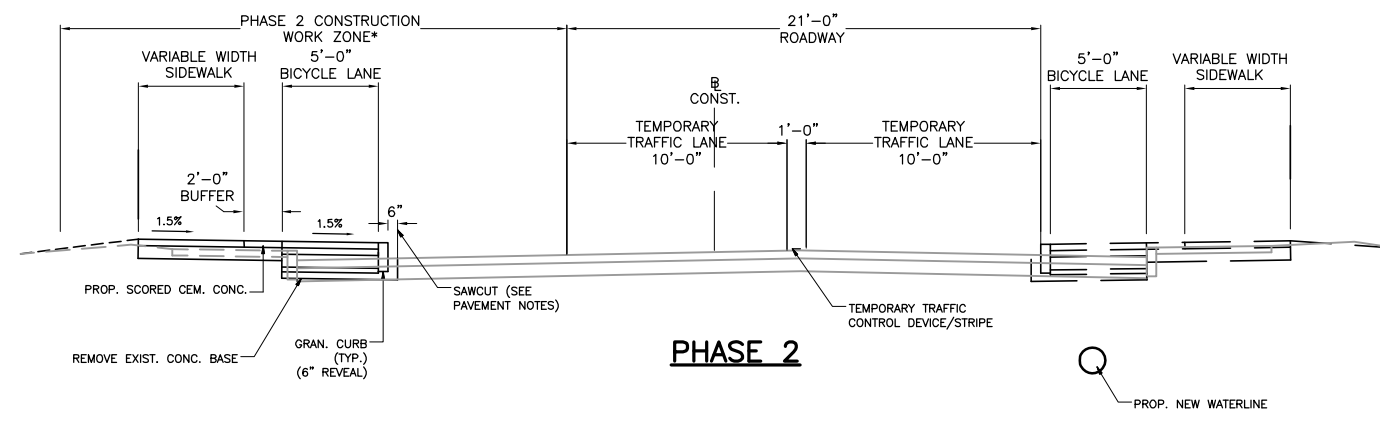
**TRAFFIC MANAGEMENT PLAN III**

PROJECT NO. 0139-68660  
 FILE NAME: CSTM001  
 SHEET NO. **68**  
 Accession No: 0139-P-xxxx



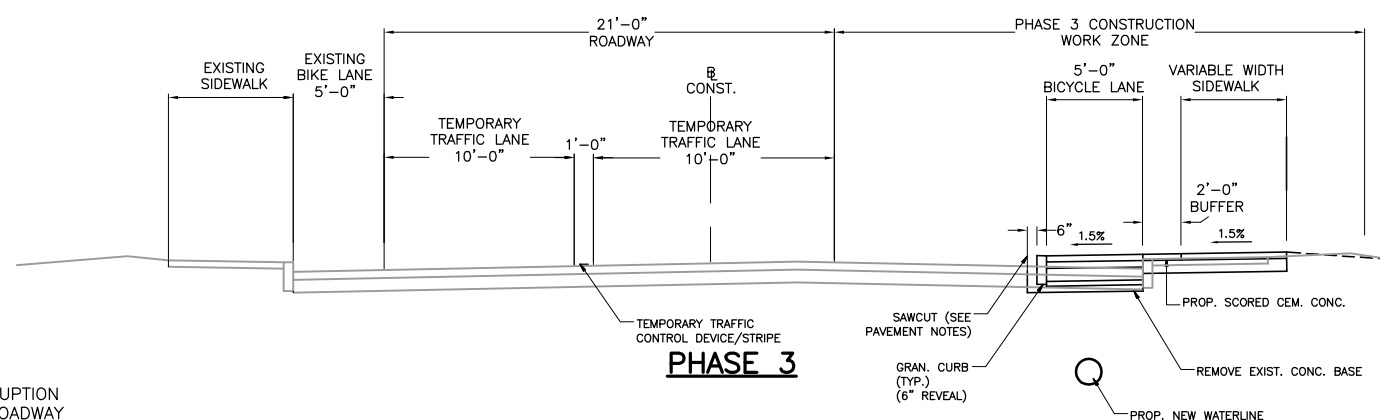
PHASE 1 CONSTRUCTION INVOLVES THE INSTALLATION OF THE NEW WATERLINE, STREET LATERALS AND SERVICES. CONTRACTOR SHALL PROVIDE ONE LANE OF VEHICULAR TRAFFIC IN EACH DIRECTION. THE EXISTING SIDEWALK AND BICYCLE LANE ON THE NORTH SIDE OF CONCORD AVENUE MUST BE MAINTAINED DURING THIS PHASE. PEDESTRIANS MUST BE DETOURED TO THE NORTHERLY SIDEWALK IN ACCORDANCE WITH DETAILS SHOWN ON TRAFFIC MANAGEMENT PLANS I AND II. TRAFFIC MUST BE MAINTAINED WHILE CONSTRUCTING WATERLINE ROAD CROSSINGS USING TEMPORARY WORK ZONES IN ACCORDANCE WITH THE DETAILS SHOWN ON TRAFFIC MANAGEMENT PLANS I AND II.

BEGIN WATER MAIN WORK AT THE WESTERN PROJECT LIMITS (BLANCHARD ROAD) TO MAXIMIZE SOIL REUSE.



PHASE 2 CONSTRUCTION INVOLVES THE INSTALLATION OF DRAINAGE ITEMS ON BOTH THE NORTH AND SOUTH SIDE OF THE STREET. CONTRACTOR SHALL PROVIDE ONE LANE OF VEHICULAR TRAFFIC IN EACH DIRECTION. WHILE DRAINAGE WORK IS UNDERWAY ON THE NORTH SIDE OF THE STREET, PEDESTRIANS MUST BE DETOURED TO THE SOUTHERLY SIDEWALK IN ACCORDANCE WITH DETAILS SHOWN ON TRAFFIC MANAGEMENT PLANS I AND II. WHILE DRAINAGE WORK IS UNDERWAY ON THE SOUTH SIDE OF THE STREET, PEDESTRIANS MUST BE DETOURED TO THE NORTHERLY SIDEWALK. IF NECESSARY, WORK CAN ALTERNATE FROM THE NORTH AND SOUTH SIDE OF THE STREET DOWN CONCORD AVENUE PROVIDED TWO-WAY TRAFFIC IS MAINTAINED AT ALL TIMES.

\*WORK ZONE TRAFFIC CONTROL SETUP IS SHOWN FOR WHEN DRAINAGE WORK IS UNDERWAY ON THE NORTH SIDE OF THE STREET. WHILE DRAINAGE WORK IS UNDERWAY ON THE SOUTH SIDE OF THE STREET, THE NORTHERLY SIDEWALK MUST BE MAINTAINED IN ACCORDANCE WITH DETAILS SHOWN ON TRAFFIC MANAGEMENT PLANS I AND II.



PHASE 3 CONSTRUCTION INVOLVES THE INSTALLATION OF THE SOUTH CURB, BICYCLE LANE AND SIDEWALK. CONTRACTOR SHALL PROVIDE ONE LANE OF VEHICULAR TRAFFIC IN EACH DIRECTION. THE EXISTING SIDEWALK AND BICYCLE LANE ON THE NORTH SIDE OF CONCORD AVENUE MUST BE MAINTAINED DURING THIS PHASE. PEDESTRIANS MUST BE DETOURED TO THE NORTHERLY SIDEWALK IN ACCORDANCE WITH DETAILS SHOWN ON TRAFFIC MANAGEMENT PLANS I AND II.

- NOTES:
1. THE CONTRACTOR SHALL SCHEDULE OPERATIONS TO MINIMIZE THE INTERRUPTION OF PEDESTRIAN TRAFFIC. THE SIDEWALK ON AT LEAST ONE SIDE OF THE ROADWAY SHALL REMAIN OPEN AND PASSABLE AT ALL TIMES.
  2. CONTINUOUS PEDESTRIAN AND BICYCLE ACCESS THAT CONFORMS TO THE AMERICANS WITH DISABILITIES ACT ACCESSABILITY GUIDELINES (A.D.A.A.G.) SHALL BE MAINTAINED AT ALL TIMES. THE CONTRACTOR IS ADVISED THAT THEY MAY NEED TO CONSTRUCT PORTIONS OF THE PROPOSED SIDEWALK OR PROVIDE A TEMPORARY PEDESTRIAN AND BICYCLE FACILITY DURING THE VARIOUS STAGES, IN ORDER TO ENSURE ACCOMODATION OF THE REQUIRES CONTINUOUS PEDESTRIAN ACCESS ROUTE.
  3. "SIDEWALK CLOSED" SIGNS SHALL BE USED AT ALL WORK ZONES WHERE NO PEDESTRIAN TRAFFIC IS PERMITTED THROUGH THE WORK AREA. ADEQUATE ALTERNATE PEDESTRIAN TRAVEL AREAS SHALL BE PROVIDED BY THE CONTRACTOR TO REPLACE SUCH CLOSURES.

REV. NO.	DATE	DRWN	CHKD	REMARKS

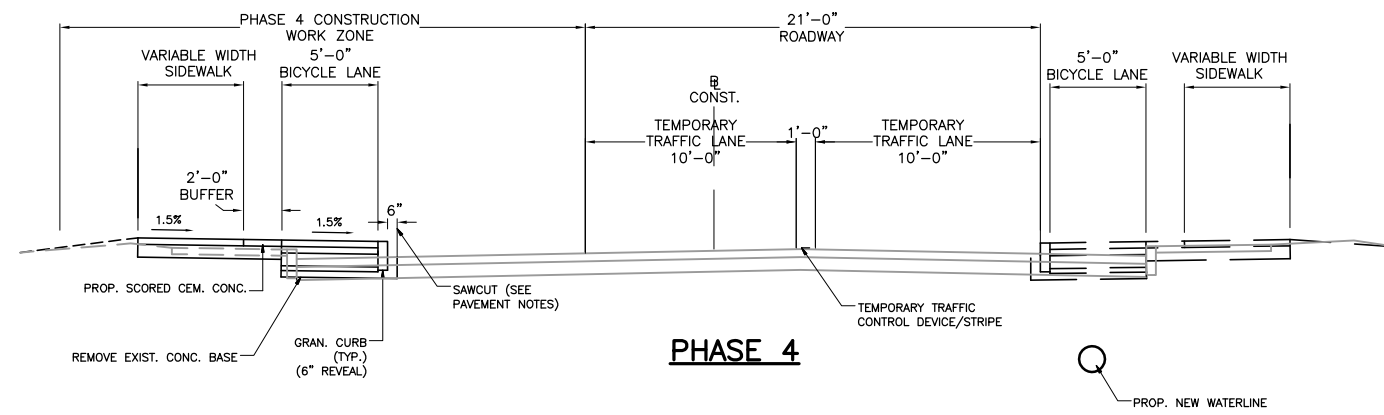
DESIGNED BY: K. THOMAS  
 DRAWN BY: K. THOMAS  
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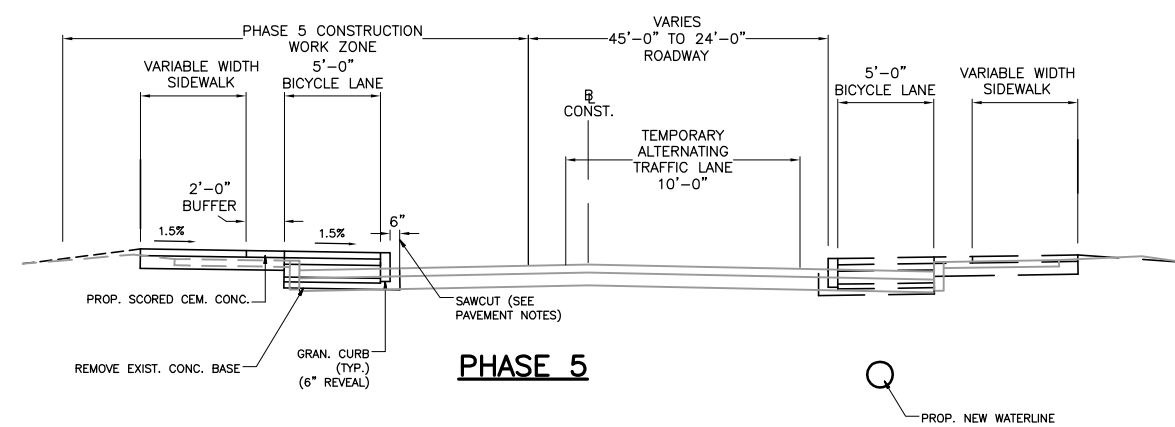
CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

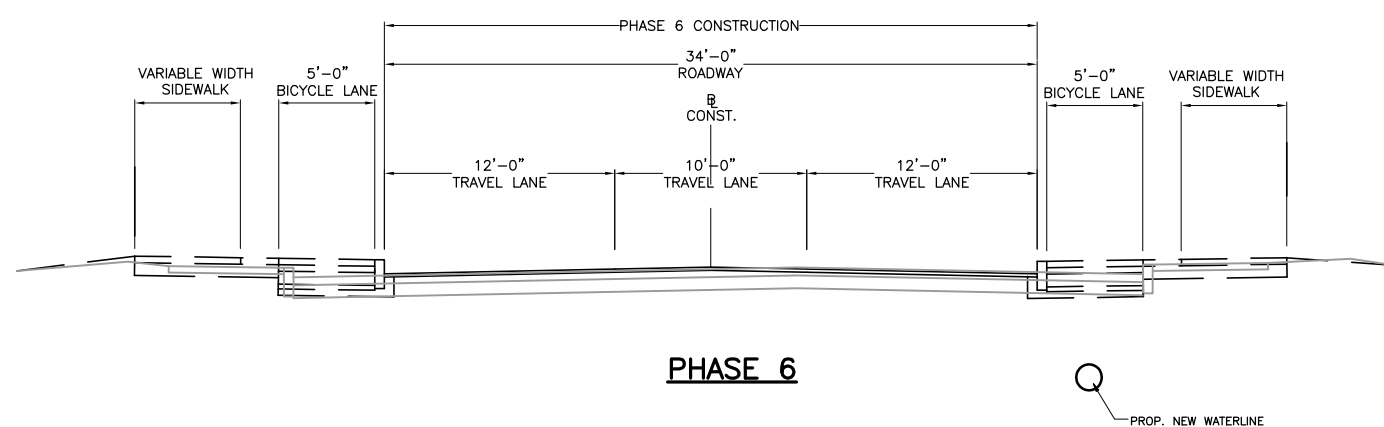
**TRAFFIC MANAGEMENT PLAN IV**



PHASE 4 CONSTRUCTION INVOLVES THE INSTALLATION OF NORTH CURB, BICYCLE LANE AND SIDEWALK, EXCLUDING FROM STA 106+00 TO STA 111+00. PHASE 3 SIDEWALK AND BIKE WAY SHALL BE COMPLETED PRIOR TO STARTING PHASE 4. CONTRACTOR SHALL PROVIDE ONE LANE OF VEHICULAR TRAFFIC IN EACH DIRECTION. THE NEWLY CONSTRUCTED SIDEWALK AND BICYCLE LANE ON THE SOUTH SIDE OF CONCORD AVENUE MUST BE MAINTAINED DURING THIS PHASE. PEDESTRIANS MUST BE DETOURED TO THE SOUTHERLY SIDEWALK IN ACCORDANCE WITH DETAILS SHOWN ON TRAFFIC MANAGEMENT PLANS I AND II.



PHASE 5 CONSTRUCTION INVOLVES THE INSTALLATION OF NORTH CURB, BICYCLE LANE AND SIDEWALK FROM STA 106+00 TO 111+00. CONTRACTOR SHALL CLOSE THE EXISTING WEST BOUND LANE OF TRAFFIC AND PROVIDE ONE LANE OF VEHICULAR TRAFFIC IN ALTERNATING DIRECTIONS IN THE EXISTING EASTBOUND LANE. THIS LANE CLOSURE SHALL ONLY BE ALLOWED BETWEEN THE HOURS OF 9:00am AND 3:00pm AND ADVANCED NOTICE SHALL BE PROVIDED WITH A VARIABLE MESSAGE BOARD THAT DISPLAYS THE MESSAGE "ALTERNATING TRAFFIC AHEAD". THE NEWLY CONSTRUCTED SIDEWALK AND BICYCLE LANE ON THE SOUTH SIDE OF CONCORD AVENUE MUST BE MAINTAINED DURING THIS PHASE. PEDESTRIANS MUST BE DETOURED TO THE SOUTHERLY SIDEWALK IN ACCORDANCE WITH DETAILS SHOWN ON TRAFFIC MANAGEMENT PLANS I AND II.



PHASE 6 CONSTRUCTION INVOLVES THE COLD PLANING AND RESURFACING OF CONCORD AVENUE AND THE ADJUSTMENT OF AFFECTED STRUCTURES BETWEEN THE NEW CURBING AND TO THE LIMITS SHOWN ON THE PLANS. THE ENTIRE WIDTH AND LENGTH OF PAVEMENT SHALL BE COLD PLANED 2 INCHES. SUBSEQUENTLY THE CONTRACTOR SHALL MILL AN ADDITIONAL 2 INCHES IN THOSE AREAS DESIGNATED ON THE PLANS TO BE COLD PLANED TO 4 INCHES. ADDITIONAL AREAS OF 4 INCH COLD PLANING MAY BE DIRECTED BY THE ENGINEER. A LEVELING ASPHALT COURSE SHALL BE PLACED SUCH THAT THE RESULTANT SURFACE EVERYWHERE IS 2 INCHES BELOW THE FINISHED SURFACE ELEVATION AS PRESCRIBED BY THE ROADWAY PROFILE AND THE PAVEMENT CROSS SLOPES SHOWN ON THE TYPICAL SECTIONS AND GRADING PLANS. THE CONTRACTOR SHALL COMPLETE THE PAVING WITH 2 INCHES OF HMA SURFACE COURSE. TRAFFIC WILL BE MAINTAINED DURING THIS PHASE USING THE DETAILS SHOWN ON TRAFFIC MANAGEMENT PLANS I AND II.

THE CONTRACTOR SHALL MAINTAIN TWO-WAY TRAFFIC IN ACCORDANCE DETAILS SHOWN ON TRAFFIC MANAGEMENT PLANS I AND II. IF IT IS NOT POSSIBLE TO PROVIDE TWO-WAY TRAFFIC, THE CONTRACTOR SHALL PROVIDE ONE LANE OF VEHICULAR TRAFFIC IN ALTERNATING DIRECTIONS. THIS LANE CLOSURE SHALL ONLY BE ALLOWED BETWEEN THE HOURS OF 9:00am AND 3:00pm AND NOTICE SHALL BE PROVIDED IN ADVANCE OF THE WORK ZONE WITH A VARIABLE MESSAGE BOARD THAT DISPLAYS THE MESSAGE "ALTERNATING TRAFFIC AHEAD".

FINAL PAVING OF THE HMA SURFACE COURSE SHALL ONLY BE ALLOWED BETWEEN THE HOURS OF 8:00pm AND 5:00am. DURING FINAL PAVING OF THE HMA SURFACE COURSE BETWEEN STA 106+00 AND STA 111+00, THE CONTRACTOR HAS THE OPTION OF PROVIDING AN OFF-SITE DETOUR AROUND FRESH POND. IF THE CONTRACTOR CHOOSES TO USE A DETOUR, THE CONTRACTOR SHALL SUBMIT A DETOUR PLAN TO THE ENGINEER FOR APPROVAL. IF A DETOUR IS USED, A VARIABLE MESSAGE BOARD THAT DISPLAYS THE MESSAGE "DETOUR AHEAD" SHALL BE PROVIDED IN ADVANCE OF THE WORK ZONE.

ACCESS TO FAWCETT STREET SHALL BE MAINTAINED AT ALL TIMES.

CONTRACTOR TO SUBMIT APPROACH AND SCHEDULE FOR COMPLETING THE PHASE 6 CONSTRUCTION TO THE CITY AND THE ENGINEER FOR REVIEW AND APPROVAL, A MINIMUM 3 WEEKS IN ADVANCE OF COMMENCING WORK. NO CASTINGS GREATER THAN 2 (TWO) INCHES HIGH SHALL BE ALLOWED IN A TRAFFIC LANE.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: A. LYNCH  
 DRAWN BY: A. LYNCH  
 SHEET CHK'D BY: C. LIGGETT  
 CROSS CHK'D BY: L. SHERMAN  
 APPROVED BY: L. SHERMAN  
 DATE: JANUARY 2010

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CITY OF CAMBRIDGE, MASSACHUSETTS  
 DEPARTMENT OF PUBLIC WORKS AND WATER DEPARTMENT

**CONCORD AVENUE  
 WATER MAIN AND ROADWAY RECONSTRUCTION**

**TRAFFIC MANAGEMENT PLAN V**