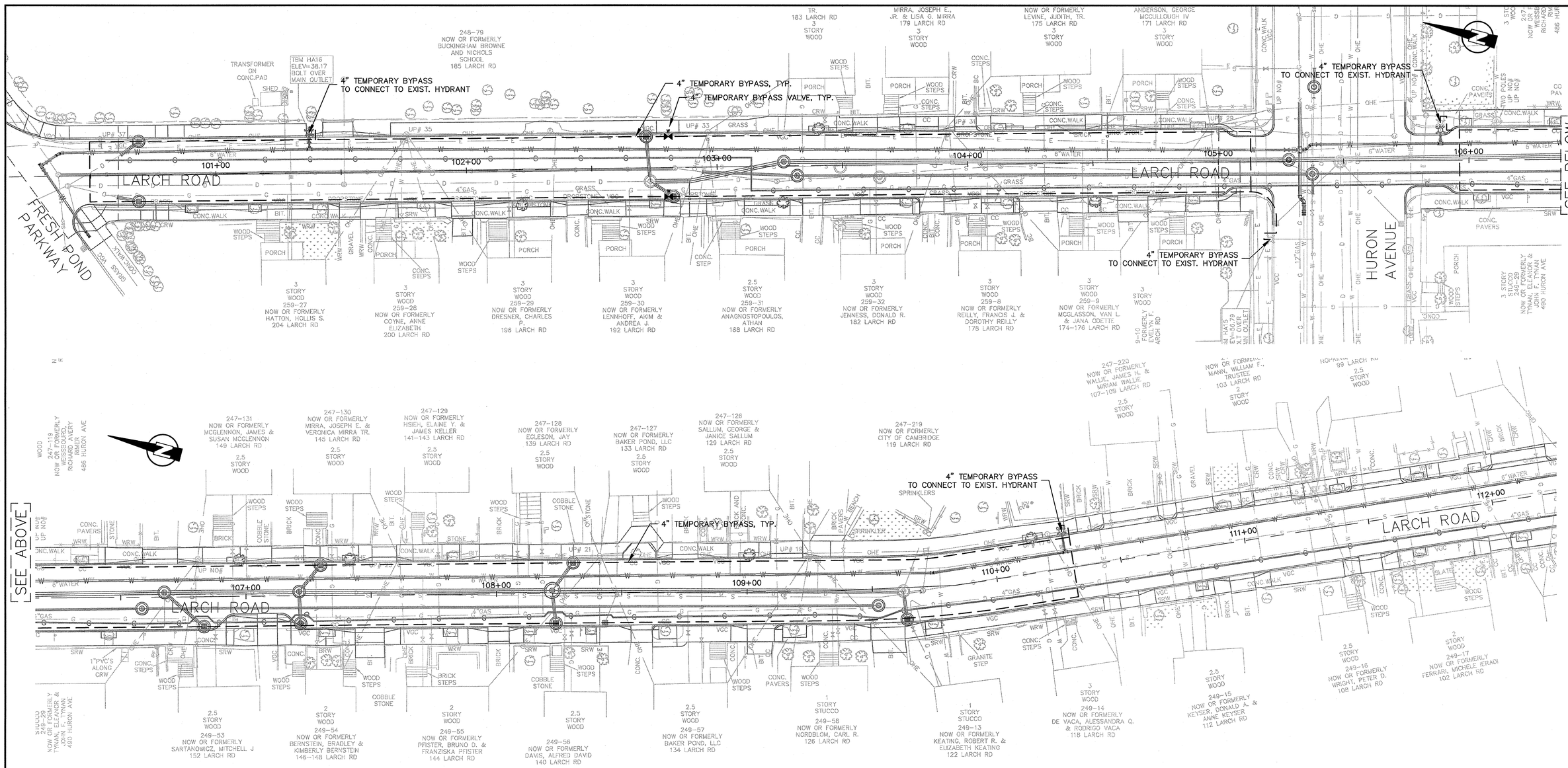

TEMPORARY WATER BYPASS NOTES

1. TEMPORARY WATER BYPASS SHALL BE INSTALLED ON LARCH ROAD BETWEEN STATION 100+00 AND 110+00.
2. TEMPORARY WATER BYPASS IS PERMITTED BETWEEN APRIL 1ST AND NOVEMBER 1ST.
3. TEMPORARY PIPING SHALL BE BURIED AT ROADWAY AND DRIVEWAY CROSSINGS. SEE SECTION 02865-3.1C OF THE CONTRACT DOCUMENTS.

CONFORMED SET

KLEINFELDER Bright People. Right Solutions. SEA
MANCHESTER, NEW HAMPSHIRE ROCKY HILL, CONNECTICUT
CAMBRIDGE, MASSACHUSETTS

MWH
285 SUMMER STREET, SUITE 200
BOSTON, MASSACHUSETTS 02210
TEL:(617)314-7100

COMMONWEALTH OF MASSACHUSETTS JOHN J. STRUZZIERI No. 30134 REGISTERED PROFESSIONAL ENGINEER 7/15/12

Scale	AS NOTED			
Date	SEPTEMBER 2012			
Job No.	2011010.01-A			
Designed by	KJL			
Drawn by	KJL			
Checked by	CMC	No.	Description	Date
Approved by	BJM	REVISIONS		

THE WORKS — CAMBRIDGE DEPARTMENT OF PUBLIC WORKS

Client	CITY OF CAMBRIDGE, MASSACHUSETTS
Project	HURON A SEWER SEPARATION PROJECT Contract No. 8A
Drawing	TEMPORARY WATER LARCH ROAD - STA 100+00 TO 115+90
Sheet	TW-1
File No.	

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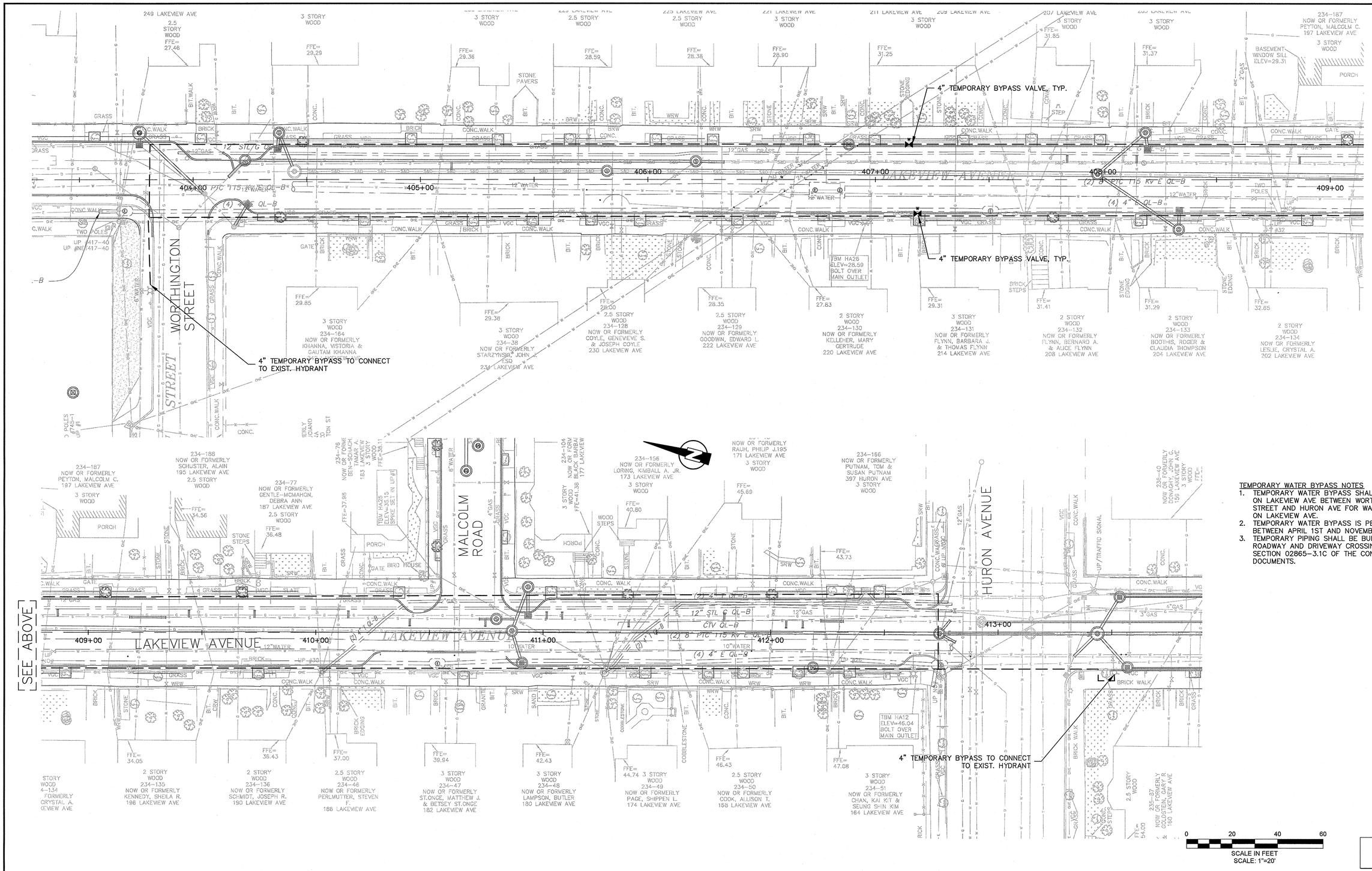


TEMPORARY WATER BYPASS NOTES

1. TEMPORARY WATER BYPASS SHALL BE INSTALLED ON LAKEVIEW AVE BETWEEN WORTHINGTON STREET AND HURON AVE FOR WATER MAIN WORK ON LAKEVIEW AVE.
2. TEMPORARY WATER BYPASS IS PERMITTED BETWEEN APRIL 1ST AND NOVEMBER 1ST.
3. TEMPORARY PIPING SHALL BE BURIED AT ROADWAY AND DRIVEWAY CROSSINGS. SEE SECTION 02865–3.1C OF THE CONTRACT DOCUMENTS.

0 20 40 60
SCALE IN FEET
SCALE: 1"=20'

CONFORMED SET

KLEINFELDER Bright People. Right Solutions. · SEA
MANCHESTER, NEW HAMPSHIRE ROCKY HILL, CONNECTICUT
CAMBRIDGE, MASSACHUSETTS

MWH
285 SUMMER STREET, SUITE 200
BOSTON, MASSACHUSETTS 02210
TEL:(617)314–7100

COMMONWEALTH OF MASSACHUSETTS JOHN J. STRUZZIERY No. 30434 REGISTERED PROFESSIONAL ENGINEER 9/13/12

Scale	AS NOTED
Date	SEPTEMBER 2012
Job No.	2011010.01-A
Designed by	KJL
Drawn by	KJL
Checked by	CMC
Approved by	BJM

No.	Description	Date
	REVISIONS	

THE WORKS — CAMBRIDGE DEPARTMENT OF PUBLIC WORKS

Client: CITY OF CAMBRIDGE, MASSACHUSETTS
Project: HURON A SEWER SEPARATION PROJECT Contract No. 8A
Drawing: TEMPORARY WATER - LAKEVIEW AVENUE
Sheet: TW-2
File No.

PLOT DATE=9/12/2012 2:34:55 PM USER=KYLE LANGLOIS FILENAME=G:_clients\Cambridge MA\2011010.01-A - Huron A\2.8 Drawings_Conformed_Lakeview_utility_coordination - (Conformed).dwg

GENERAL NOTES

GENERAL

THESE NOTES ARE GENERAL AND APPLY TO THE ENTIRE PROJECT EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE.

STRUCTURAL DIMENSIONS CONTROLLED BY OR RELATED TO MECHANICAL OR ELECTRICAL EQUIPMENT SHALL BE COORDINATED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. BOLT SIZES, TYPES, AND PATTERNS SHALL BE VERIFIED WITH THE MANUFACTURER. ALL BOLT PATTERNS SHALL BE TEMPLATED TO INSURE ACCURACY OF PLACEMENT.

MECHANICAL AND ELECTRICAL EQUIPMENT SUPPORTS, ANCHORAGES, OPENINGS, RECESSES AND REVEALS NOT SHOWN ON THE STRUCTURAL DRAWINGS BUT REQUIRED BY OTHER CONTRACT DRAWINGS, SHALL BE PROVIDED FOR PRIOR TO PLACING CONCRETE.

STRUCTURAL DRAWINGS SHALL BE USED IN COORDINATION WITH MECHANICAL, ELECTRICAL, ARCHITECTURAL, CIVIL DRAWINGS AND SHOP DRAWINGS PROVIDED BY MANUFACTURERS OF EQUIPMENT.

STRUCTURES HAVE BEEN DESIGNED FOR OPERATIONAL, HYDROSTATIC, UPLIFT, AND BACKFILL LOADS ON THE COMPLETED STRUCTURES. THE STRUCTURES HAVE NOT BEEN DESIGNED TO RESIST THESE LOADS WHILE ONLY PARTIALLY CONSTRUCTED. DURING CONSTRUCTION, THE STRUCTURES SHALL BE PROTECTED FROM ALL CONSTRUCTION LOADS BY BRACING AND BALANCING UNTIL ALL STRUCTURAL ELEMENTS ARE IN PLACE, AND ALL CONCRETE HAS REACHED THE SPECIFIED 28 DAY COMPRESSIVE STRENGTH. OVERLOADING OF ANY STRUCTURAL ELEMENT IS PROHIBITED.

UNLESS OTHERWISE SHOWN, ON ALL STRUCTURAL DRAWINGS THE FINISHED GRADE AROUND STRUCTURES IS SHOWN THUS ////////// INDICATING EITHER GROUND SURFACE, TOP OF CONCRETE SLAB, OR AC PAVEMENT. FOR DETAILS OF FINISH SURFACES SEE CIVIL AND ARCHITECTURAL DRAWINGS.

CONCRETE (EXCEPT PRECAST CONCRETE)

UNLESS OTHERWISE NOTED OR SPECIFIED, ALL STRUCTURAL CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 4500 PSI IN 28 DAYS.

REINFORCEMENT STEEL SHALL BE DEFORMED BARS CONFORMING IN QUALITY TO THE REQUIREMENTS OF ASTM A-615, "SPECIFICATIONS FOR DEFORMED BILLET-STEEL BARS FOR CONCRETE REINFORCEMENT", GRADE 60

COLUMN SPIRALS SHALL CONFORM TO ASTM A-615, "DEFORMED AND PLAIN BILLET-STEEL BARS FOR CONCRETE REINFORCEMENT, GRADE 60 OR ASTM A-82 "STEEL WIRE, PLAIN, FOR CONCRETE REINFORCEMENT".

ALL DETAILING, FABRICATION AND PLACING OF REINFORCING BARS, UNLESS OTHERWISE INDICATED, SHALL BE IN ACCORDANCE WITH ACI-315, "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", LATEST EDITION.

TOLERANCES IN PLACING REINFORCEMENT SHALL BE:
+/- 3/8 INCH FOR MEMBERS WITH D </= 8 INCHES
+/- 1/2 INCH FOR MEMBERS WITH D > 8 INCHES

ALL CONSTRUCTION JOINTS, SHALL BE ROUGH AND THOROUGHLY CLEANED FOR BOND.

LOCATION OF ALL CONSTRUCTION JOINTS SHALL BE AS SHOWN ON THE DRAWINGS OR APPROVED BY THE ENGINEER. ALL CONSTRUCTION JOINTS LOCATED ON THE DRAWINGS OR REQUIRED FOR CONSTRUCTION, BUT NOT SHOWN ON THE DRAWINGS, SHALL HAVE A 6" FLATSTRIP WATERSTOP, IF IN CONTACT WITH WATER. IN ADDITION, JOINTS IN ALL SLABS COVERED WITH WATER, SHALL HAVE BOTH A 6" FLATSTRIP WATERSTOP AND A SEALANT GROOVE.

DOWELS, PIPE, WATERSTOPS AND OTHER INSTALLED MATERIALS AND ACCESSORIES SHALL BE HELD SECURELY IN POSITION WHILE CONCRETE IS BEING PLACED.

UNLESS OTHERWISE INDICATED, ASIDE FROM NORMAL ACCESSORIES USED TO HOLD REINFORCING BARS FIRMLY IN POSITION, THE FOLLOWING SHALL BE ADDED:

A) IN SLABS #5 RISER BARS AT 36 INCHES OC MAXIMUM TO SUPPORT TOP REINFORCING BARS.

B) IN WALLS WITH 2 CURTAINS #3 U OR Z SHAPE SPACERS AT 6 FEET OC EACH WAY.

VERTICAL REINFORCEMENT FOR CONCRETE OR MASONRY SHALL BE SPLICED WITH DOWEL BARS OF THE SAME SIZE AND SPACING FROM THE FOUNDATION USING A STANDARD SPLICE LENGTH UNLESS INDICATED OTHERWISE.

SEALANT SHALL BE PLACED AT THE TOP OF ALL JOINTS RECEIVING EXPANSION JOINT FILLER. SEALANT DEPTH SHALL BE THE JOINT FILL THICKNESS OR 1/2", WHICHEVER IS LESS.

ALL GROUT SHALL BE NON-SHRINK GROUT, UNLESS INDICATED OTHERWISE.

UNLESS OTHERWISE SHOWN CONCRETE WALLS AND SLABS SHALL BE REINFORCED AS FOLLOWS: #4@12" EW , CENTER OF 8" SECTIONS; #5@12" EW, CENTER OF 8" SECTIONS; #5@ 12" EW EF OF 10" SECTIONS; #5@8" EW EF OF 12" AND THICKER SECTIONS.

METAL CLIPS OR SUPPORTS SHALL NOT BE PLACED IN CONTACT WITH THE FORMS OR THE SUBGRADE. CONCRETE BLOCKS (OR DOBIES) SUPPORTING BARS ON SUBGRADE SHALL BE IN SUFFICIENT NUMBERS TO SUPPORT THE BARS WITHOUT SETTLEMENT, BUT IN NO CASE SHALL SUCH SUPPORT BE CONTINUOUS.

DOWELS SHALL BE WIRED OR OTHERWISE HELD IN POSITION. THEY SHALL NOT BE SHOVED INTO FRESHLY PLACED CONCRETE.

UNLESS OTHERWISE INDICATED ON THE DRAWINGS, LAPS OF REINFORCEMENT SHALL BE AS SHOWN ON DETAIL S-143.

REINFORCING BARS AND ACCESSORIES SHALL NOT BE IN CONTACT WITH ANY PIPE, PIPE FLANGE OR METAL PARTS EMBEDDED IN CONCRETE, A MINIMUM OF 2 INCHES CLEARANCE SHALL BE PROVIDED AT ALL TIMES.

ALL ITEMS EMBEDDED IN CONCRETE SHALL BE SPACED ON CENTER AT LEAST 4 TIMES THEIR OUTSIDE DIMENSION. THE OUTSIDE DIMENSION SHALL NOT EXCEED ONE THIRD OF THE MEMBER THICKNESS

UNLESS OTHERWISE SHOWN ON THE DRAWINGS CONCRETE COVER FOR REINFORCING BARS SHALL BE AS FOLLOWS:

FOR CONCRETE PLACED AGAINST EARTH SEE CONSTRUCTION JOINT DETAILS FOR THIN SLABS-ON-GRADE. BOTTOM COVER MAY BE LESS THAN 3" IF SO INDICATED	3"
FOR SURFACES IN CONTACT WITH WATER OR WEATHER AND FORMED SURFACES IN CONTACT WITH EARTH	2"
FOR CONCRETE NOT EXPOSED TO WEATHER, OR IN CONTACT WITH WATER OR EARTH	1½"

UNLESS OTHERWISE NOTED, WALLS AND SLABS SHOWN WITH A SINGLE LAYER OF REINFORCEMENT SHALL HAVE THAT REINFORCEMENT CENTERED

SLABS WITH SLOPING SURFACES SHALL HAVE THE INDICATED SLAB THICKNESS MAINTAINED AS THE MINIMUM. SLAB BOTTOMS MAY EITHER SLOPE WITH THE TOP SURFACE OR BE LEVEL. REINFORCING IN SLABS WITH SLOPING SURFACES SHALL BE PLACED AT THE REQUIRED CLEARANCE FROM THE SLAB SURFACES.

TESTING HYDRAULIC STRUCTURES

WHEN FILLING THE STRUCTURES WITH WATER FOR THE HYDRAULIC TESTING, THE FILL RATE SHALL NOT EXCEED 2 FEET PER DAY. HYDRAULIC TESTING SHALL BE DEEMED SUCCESSFUL IF A) THERE ARE NO VISIBLE LEAKS AND B)WATER LOSS IS LIMITED TO 0.2% BY VOLUME AT THE CONCLUSION OF (7) -DAY TEST.

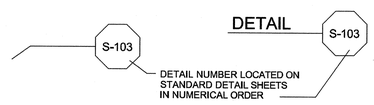
STRUCTURAL STANDARD DETAILS

DETAILS ON GS SHEETS ARE PART OF MWH'S STRUCTURAL STANDARD DETAILS.

THESE DETAILS ARE TO BE USED WHEN REFERRED TO OR WHEN NO OTHER MORE RESTRICTIVE OR DIFFERENT DETAILS ARE INDICATED ON THE DRAWINGS.

DETAILS NOT PERTAINING TO THE PROJECT ARE MARKED THUS ▒▒▒

STRUCTURAL STANDARD DETAIL CALLOUT



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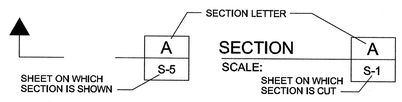

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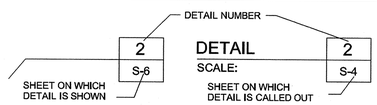


REV 060208

DESIGN CRITERIA

DESIGN IN ACCORDANCE WITH 2009 INTERNATIONAL BUILDING CODE AND THE REQUIREMENTS OF ASCE 7-05 EXCEPT WHERE OTHER APPLICABLE CODES OR THE FOLLOWING NOTES ARE MORE RESTRICTIVE. CONSTRUCTION SHALL CONFORM TO THE REQUIREMENTS OF 2009 INTERNATIONAL BUILDING CODE AND ASCE 7-05.

SELECT GEO-TECHNICAL INFORMATION:

ALLOWABLE NET BEARING PRESSURE UNDER DRAIN VAULT NO. 2:
ALL LOADS (PSF)..... 2500
TOTAL SETTLEMENT (INCH)..... 0.5

TOP SLAB LIVE LOAD (DRAIN VAULT NO.2):

CONCENTRATED LOAD..... HS20-44
IMPACT LOAD (% OF WHEEL LOAD)..... 30

SNOW LOAD:

DRAIN VAULT NO.2 IS BELOW GRADE AND WILL HAVE GROUND SNOW LOAD APPLIED WHEN SHOWN TO RESULT IN THE MOST SEVERE LOAD COMBINATION.

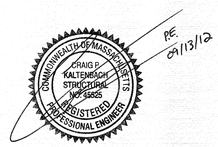
GROUND SNOW LOAD (PSF)..... 35

WIND LOAD:

DRAIN VAULT NO. 2 IS BELOW GRADE. WIND LOAD IS NOT APPLICABLE.

SEISMIC LOADS (DRAIN VAULT NO.2):

Ss (0.2 SEC, 5% DAMPING)..... 0.30
S1 (1.0 SEC, 5% DAMPING)..... 0.07
SITE CLASS..... D
Fa..... 1.56
Fv..... 2.40
Sds..... 0.312
Sd1..... 0.112
OCCUPANCY CATEGORY..... III
SEISMIC DESIGN CATEGORY..... B
SEISMIC IMPORTANCE FACTOR, Ie..... 1.25
ANALYSIS PROCEDURE..... EQUIVALENT LATERAL FORCE
LATERAL FORCE RESISTING SYSTEM..... ORDINARY REINFORCED CONCRETE SHEAR WALLS
RESPONSE MODIFICATION FACTOR, R..... 3
SEISMIC RESPONSE COEFFICIENT..... 0.13
DESIGN BASE SHEAR (KIPS)..... 39



CONFORMED SET

KLEINFELDER Bright People. Right Solutions. | SEA
MANCHESTER, NEW HAMPSHIRE ROCKY HILL, CONNECTICUT
CAMBRIDGE, MASSACHUSETTS

MWH
285 SUMMER STREET, SUITE 200
BOSTON, MASSACHUSETTS 02210
TEL:(617)314-7100

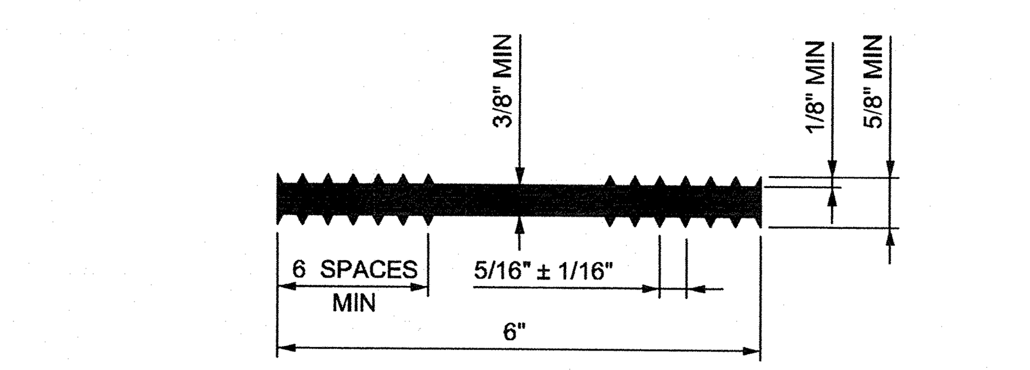
Scale	NOT TO SCALE
Date	SEPTEMBER 2012
Job No.	1010691
Designed by	SKJ
Drawn by	AMF
Checked by	MS
Approved by	CPK

No.	Description	Date
	REVISIONS	

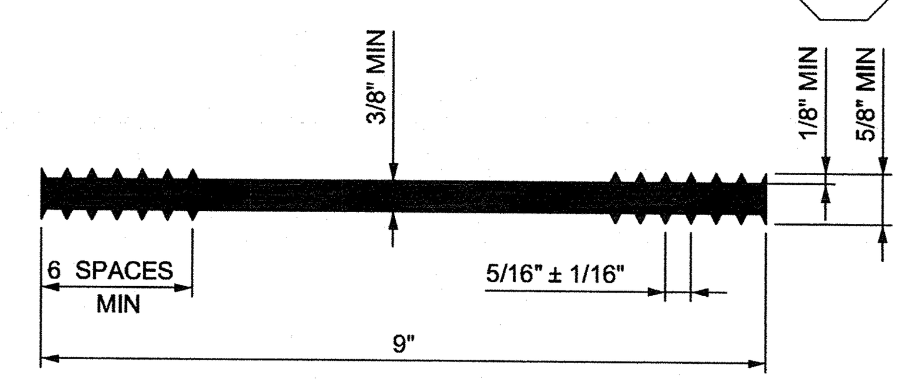
THE WORKS — CAMBRIDGE DEPARTMENT OF PUBLIC

CITY OF CAMBRIDGE, MASSACHUSETTS
HURON A SEWER SEPARATION PROJECT
CONTRACT NO. 8A
STRUCTURAL GENERAL
GENERAL NOTES

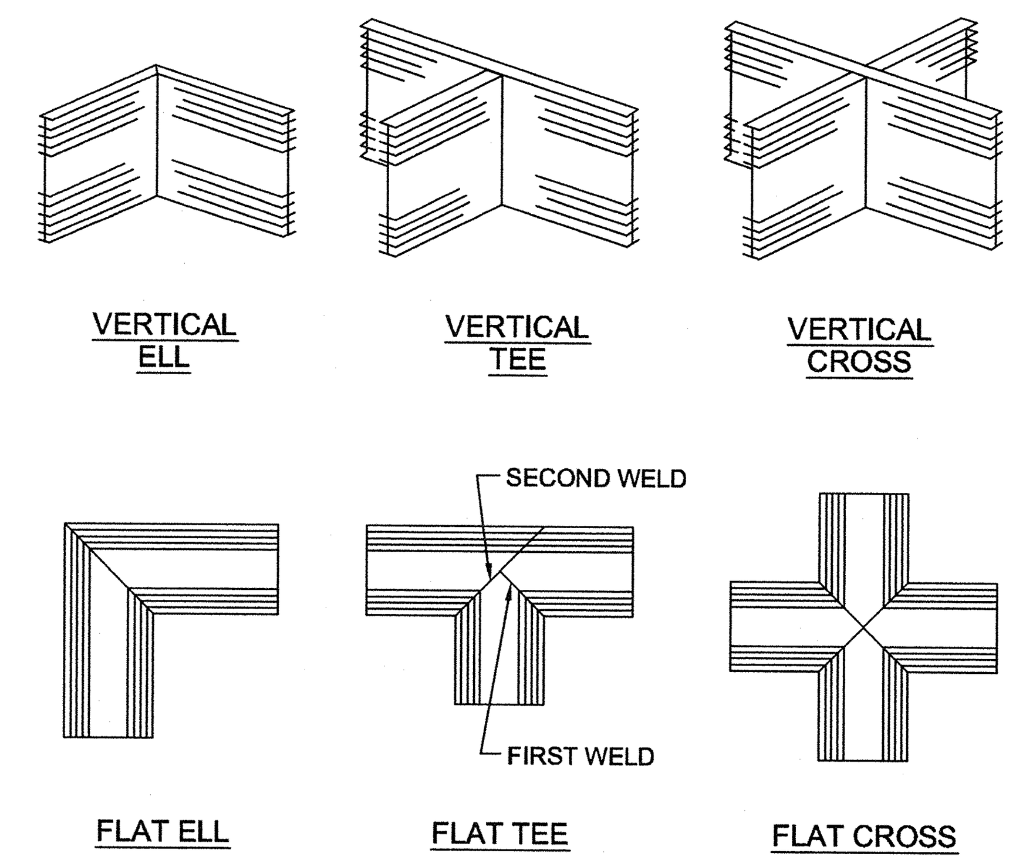
Sheet No. SG-1
File No.



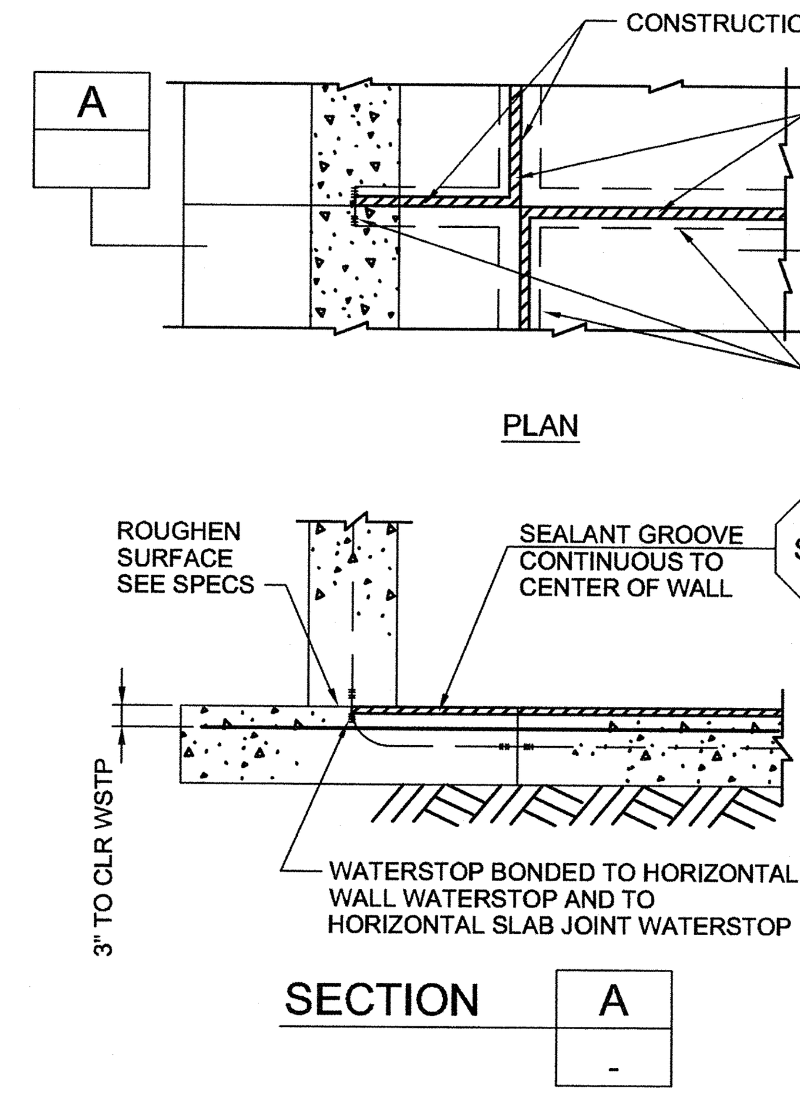
6" FLATSTRIP WATERSTOP
REV 032408 S-105



9" FLATSTRIP WATERSTOP
REV 032408 S-106

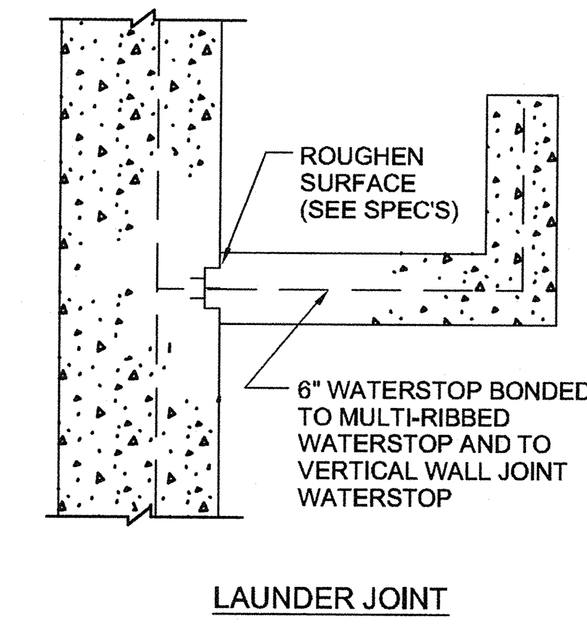


PREFABRICATED WATERSTOP JOINTS
REV 032508 S-108



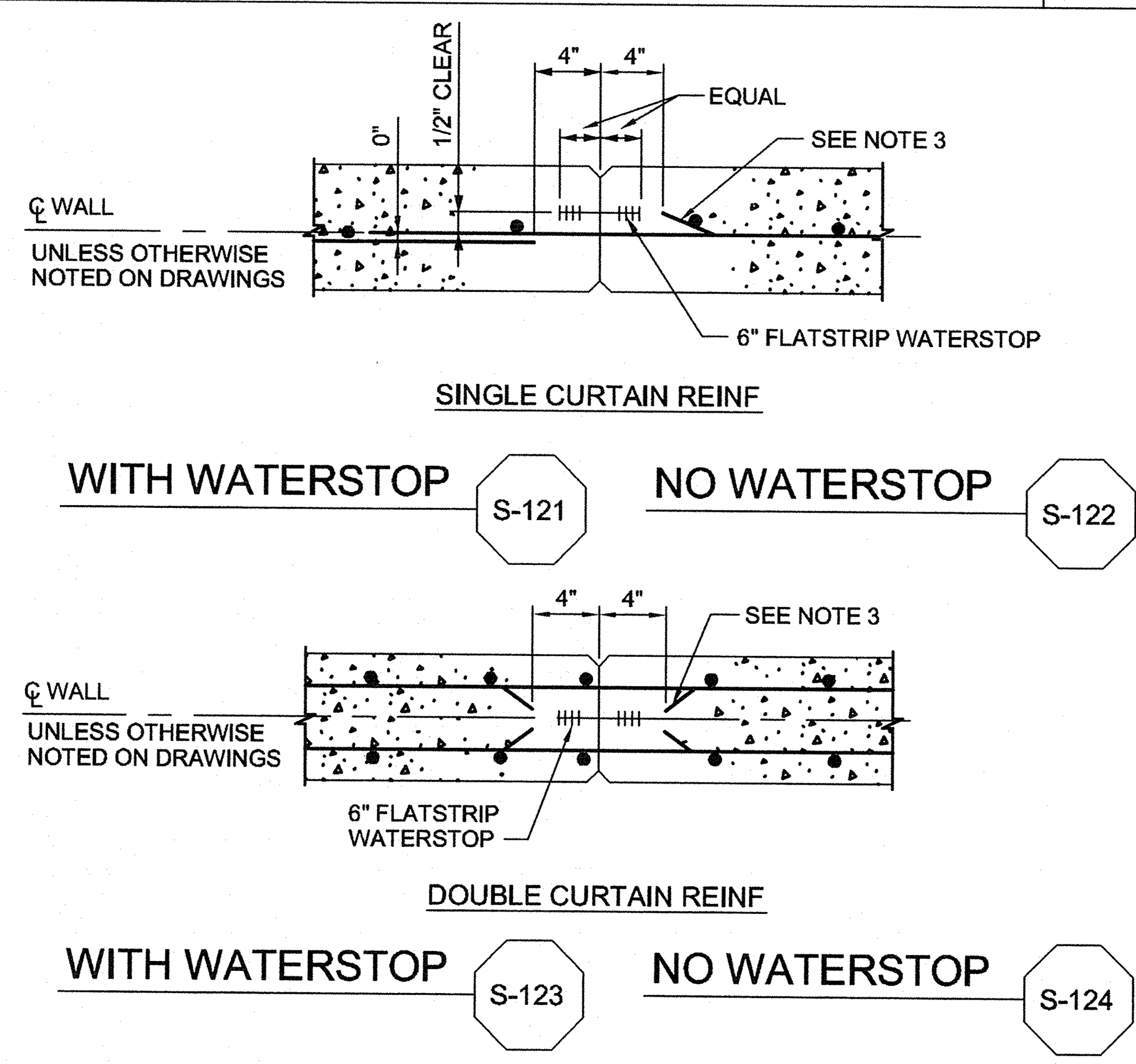
NOTES:

1. SEALANT GROOVE SHALL BE CONTINUED UNDER WALL & SEALANT SHALL BOND WITH WALL WATERSTOP IN ALL CASES WHERE SUCH WATERSTOP OCCURS.
2. SEALANT UNDER WALL SHALL BE IN PLACE PRIOR TO PLACEMENT OF CONCRETE FOR WALL.
3. CONSTRUCTION JOINTS PASSING THROUGH VARIOUS MEMBERS OF A WATER RETAINING STRUCTURE SHALL BE SEALED WITH WATERSTOPS BONDED TOGETHER, SO AS TO PROVIDE A CONTINUOUS WATERTIGHT JOINT.



LAUNDER JOINT

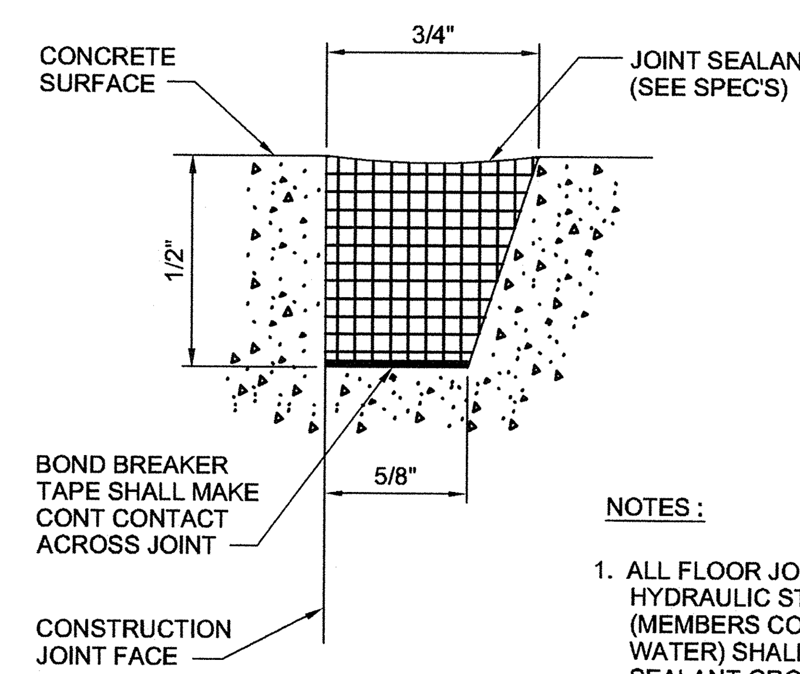
CONSTRUCTION JOINT WALL TO SLAB
REV 032708 S-118



NOTES:

1. WHERE WATERSTOP IS REQUIRED IN SINGLE CURTAIN WALL REINFORCEMENT, PLACE WATERSTOP ON WATER SIDE OF WALL.
2. UNLESS OTHERWISE NOTED 3/4" CHAMFERS SHALL BE OMITTED IN SURFACES TO RECEIVE ARCHITECTURAL TREATMENT.
3. UNLESS SPECIFICALLY NOTED OTHERWISE #5 AND LARGER BARS SHALL BE CONTINUOUS THRU JOINT. #4 AND SMALLER BARS SHALL STOP ALTERNATE BARS AT JOINT.
4. STAGGER SPLICES UNLESS NOTED OTHERWISE.

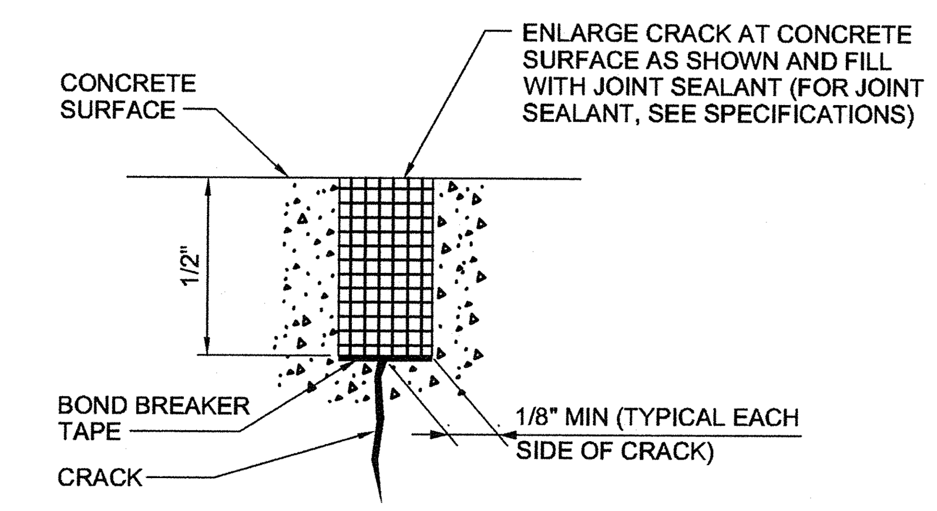
VERTICAL WALL CONSTRUCTION JOINT
REV 032708



NOTES :

1. ALL FLOOR JOINTS OF HYDRAULIC STRUCTURES (MEMBERS COVERED WITH WATER) SHALL HAVE A SEALANT GROOVE
2. SANDBLASTING REQUIRED PRIOR TO APPLICATION OF PRIMER

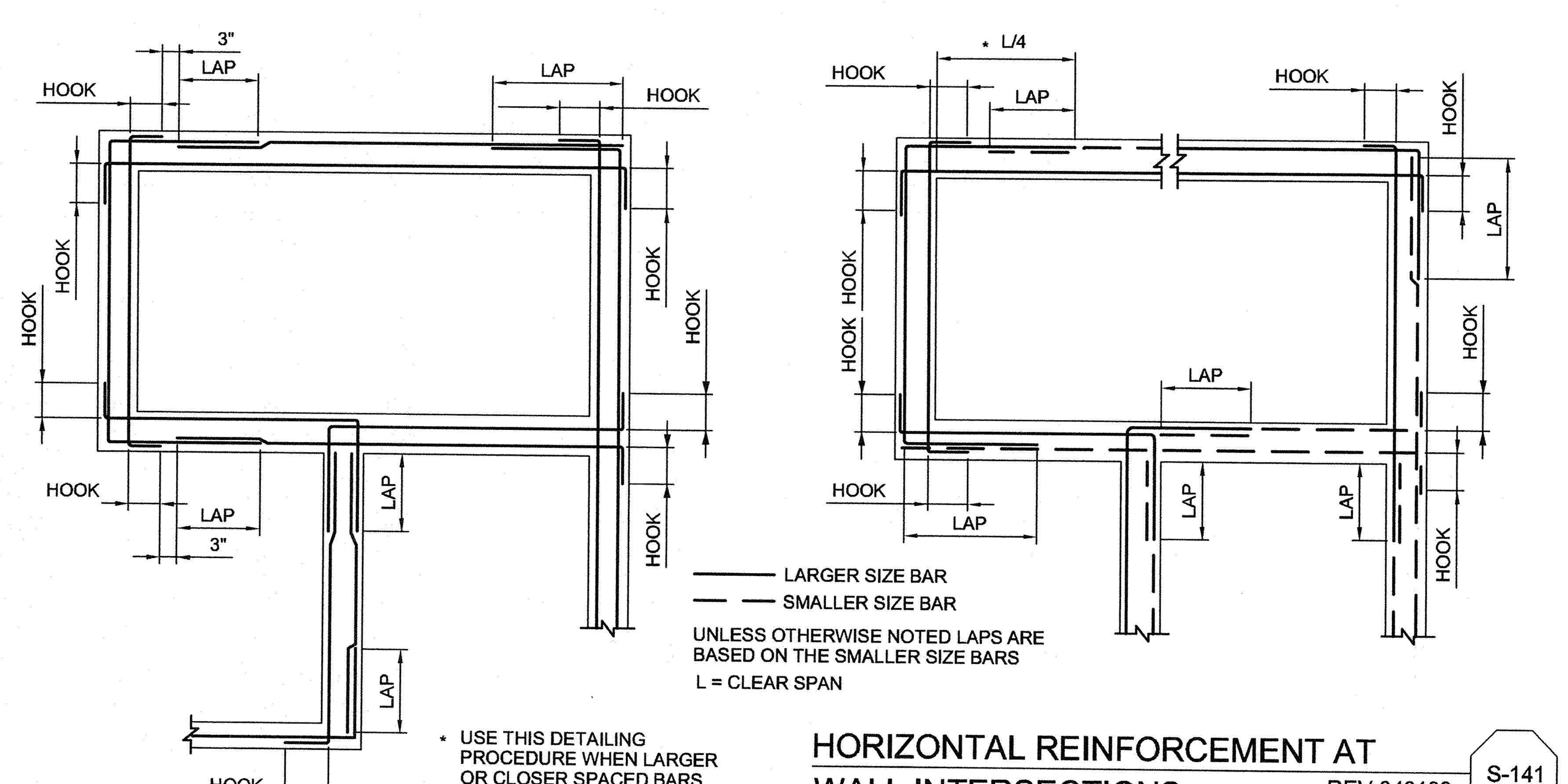
SEALANT GROOVE
REV 032808 S-131



NOTES :

1. PRIOR TO HYDROTESTING, STRUCTURES TO CONTAIN WATER SHALL HAVE ALL CRACKS REPAIRED AS SHOWN IN THIS DETAIL.
2. CRACKS IN EXPOSED COVER SLABS NOT RECEIVING COATINGS SHALL BE REPAIRED AS SHOWN IN THIS DETAIL.

CONCRETE CRACK REPAIR
REV 032808 S-132



• USE THIS DETAILING PROCEDURE WHEN LARGER OR CLOSER SPACED BARS ARE CALLED OUT FOR CORNERS

HORIZONTAL REINFORCEMENT AT WALL INTERSECTIONS
REV 040108 S-141

COMMONWEALTH OF MASSACHUSETTS
CRAIG F. KALTENBACH
STRUCTURAL
REGISTERED PROFESSIONAL ENGINEER

P.E. 09/13/12

CONFORMED SET

KLEINFELDER Bright People. Right Solutions.
MANCHESTER, NEW HAMPSHIRE · ROCKY HILL, CONNECTICUT · CAMBRIDGE, MASSACHUSETTS
SEA

MWH
285 SUMMER STREET, SUITE 200
BOSTON, MASSACHUSETTS 02210
TEL:(617)314-7100

Scale	NOT TO SCALE
Date	SEPTEMBER 2012
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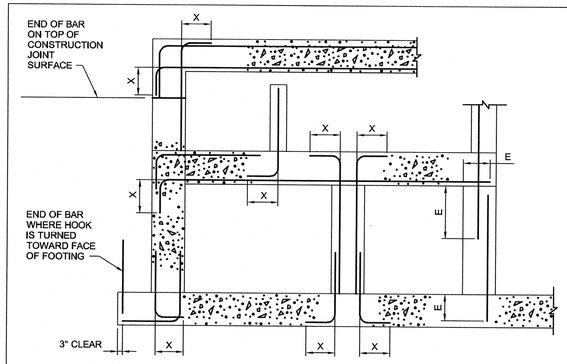
No.	Description	Date

REVISIONS

THE WORKS CAMBRIDGE DEPARTMENT OF PUBLIC WORKS

CITY OF CAMBRIDGE, MASSACHUSETTS
HURON A SEWER SEPARATION PROJECT
CONTRACT NO. 8A
STRUCTURAL GENERAL
STRUTURAL DETAILS I

Sheet No. SG-2
File No.



SECTION

LENGTH (*)			
BAR SIZE	HOOK X	LAP	EMBEDMENT E
#3	6"	16" (21")	12" (16")
#4	8"	16" (21")	12" (16")
#5	10"	20" (26")	15" (20")
#6	12"	28" (37")	22" (28")
#7	14"	48" (62")	37" (48")
#8	16"	62" (81")	48" (62")
#9	19"	79" (102")	61" (79")
#10	22"	100" (130")	77" (100")
#11	24"	123" (160")	95" (123")

* USE LENGTH IN PARENTHESIS FOR WALL HORIZONTAL REBARS AND SLAB BARS WITH 12" OR MORE OF FRESH CONCRETE UNDERNEATH

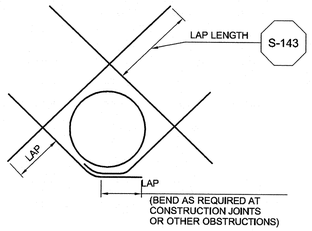
NOTES:

1. USE LAP LENGTHS AS DETERMINED FROM THESE TABLES UNLESS SHOWN OTHERWISE.
2. THE TABLES SHOWN ARE FOR f'c=4000psi, fy=60,000psi, 1.5" MIN CONCRETE COVER AND 3" MIN BAR SPACING.
3. MULTIPLY THE LAP AND E SHOWN IN THESE TABLES BY 1.5 FOR EPOXY COATED REINFORCING.
4. WHEN BARS OF DIFFERENT SIZES ARE LAP SPLICED, LAP LENGTH SHALL BE THE LARGER OF:

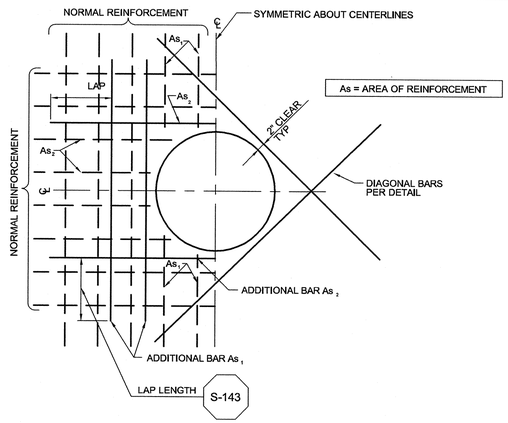
   EMBEDMENT LENGTH OF LARGER BAR
   LAP LENGTH OF SMALLER BAR
5. UNLESS NOTED OTHERWISE USE REBAR COUPLERS FOR SPLICES OF #11 AND LARGER BARS.
6. ALL DOWEL BARS SHALL EXTEND AN EMBEDMENT LENGTH E INTO ANOTHER MEMBER OR ACROSS A CONSTRUCTION JOINT UNLESS SHOWN TO SPLICE WITH OTHER BARS OR TO EXTEND TO THE FAR FACE OF THE MEMBER AND END WITH A STANDARD HOOK.

STANDARD 90° BAR HOOKS, EMBEDMENT LENGTHS AND LAP LENGTHS

REV 040108 — S-143



DIAGONAL BAR DETAILING

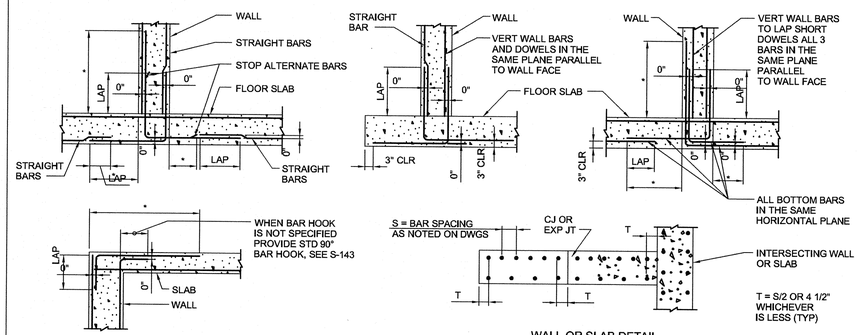


NOTES:

1. CUT NORMAL REINFORCEMENT AT OPENINGS: AS, AND AS$_2$ = 1/2 AREA OF CUT BARS TO BE ADDED ON EACH SIDE OF OPENING.
2. ADDITIONAL BARS AS, AND AS$_2$ TO BE PLACED:
   A) AT CENTERLINE OF WALLS OR SLABS WHERE ONE LAYER OF REINFORCEMENT IS PROVIDED.
   B) AT EACH FACE OF WALLS OR SLABS WHERE TWO LAYERS OF REINFORCEMENT ARE PROVIDED.
3. INCREASE SIZE OF ADDITIONAL BARS AS NEEDED TO FIT WITHIN A DISTANCE OF 2 X WALL / SLAB THICKNESS FROM OPENING, PROVIDE 2" MIN CLEAR BETWEEN BARS.
4. DIAGONAL BARS TO BE PLACED;
   A) AT CENTERLINE OF WALL OR SLAB WHERE ONE LAYER OF REINFORCEMENT IS PROVIDED.
   B) AT EACH FACE OF WALL OR SLAB WHERE TWO LAYERS OF REINFORCEMENT ARE PROVIDED. (LOCATE ON INSIDE FACE OF TYPICAL REINFORCEMENT.)
5. UNLESS OTHERWISE NOTED, SIZE OF DIAGONAL BARS SHALL BE THE SIZE OF THE LARGEST NORMAL REINFORCING BAR CUT.
6. THIS DETAIL TO BE USED ONLY WHEN NO OTHER DETAIL IS INDICATED ON THE DRAWINGS.
7. WHERE A SLAB OR INTERSECTING WALL CONNECTS WITHIN ONE WALL THICKNESS OF THE OPENING, ADDITIONAL BARS ON THAT SIDE MAY BE OMITTED.

ADDITIONAL BAR DETAILING

(12" DIA OR LARGER) REV 081709 — S-144

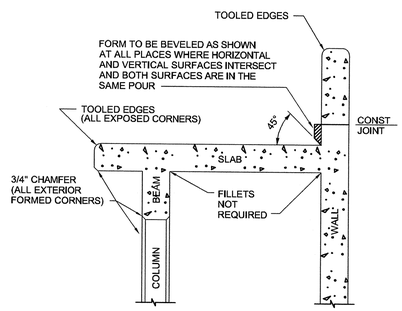


WALL OR SLAB DETAIL

* SEE DRAWINGS

STANDARD FOR REINFORCING BAR DETAILING

REV 051508 — S-149



FORMING DETAILS

REV 050808 — S-152

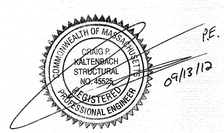
ANCHOR BOLT DIAMETER (Inches)	MINIMUM EMBEDMENT	
	TOP OF COLUMNS	OTHER APPLICATIONS
1/4	5	3
3/8	5	3
1/2	6	4
5/8	6	4.5
3/4	7	5
7/8	8	6
1	9	7
1 1/8	10	8
1 1/4	11	9

NOTES:

1. USE ONLY HEADED ANCHORS, J-BOLTS ARE NOT ALLOWED
2. THIS DETAIL APPLIES TO BOTH CONCRETE AND MASONRY
3. IN MASONRY PROVIDE A 1" ANNULAR SPACE IN BLOCK SHELL AROUND ANCHOR. GROUT TO SURFACE
4. FOR ADHESIVE ANCHORS USE THE TOP OF COLUMN EMBEDMENTS UNLESS THE MANUFACTURER'S LITERATURE CALLS OUT LONGER LENGTHS

ANCHOR BOLT EMBEDMENT

REV 051408 — S-175



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MWH
285 SUMMER STREET, SUITE 200
BOSTON, MASSACHUSETTS 02210
TEL:(617)314-7100

Scale	NOT TO SCALE			
Date	SEPTEMBER 2012			
Job No.	1010691			
Designed by	SKJ			
Drawn by	AMF			
Checked by	MS	No.	Description	Date
Approved by	CPK	REVISIONS		

THE WORKS — CAMBRIDGE DEPARTMENT OF PUBLIC WORKS

CITY OF CAMBRIDGE, MASSACHUSETTS
HURON A SEWER SEPARATION PROJECT
CONTRACT NO. 8A
STRUCTURAL GENERAL
STRUTURAL DETAILS II

Sheet No. SG-3
File No.

STRUCTURAL NOTES

GENERAL

G.1 STRUCTURAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE 8TH EDITION OF THE MASSACHUSETTS STATE BUILDING CODE.

G.2 PROVIDE WATERSTOPS IN ALL HORIZONTAL AND VERTICAL CONSTRUCTION JOINTS WHERE WATERSTOPS ARE INDICATED OR SPECIFIED. WATERSTOPS SHALL FORM A CONTINUOUS WATERTIGHT BARRIER TO PREVENT LEAKAGE.

G.3 THE CONTRACTOR SHALL NOTIFY THE ENGINEER WHEN IN THE COURSE OF CONSTRUCTION CONDITIONS ARE UNCOVERED WHICH ARE UNANTICIPATED OR OTHERWISE APPEAR TO PRESENT A DANGEROUS CONDITION.

G.4 THE CONTRACTOR SHALL FIELD MEASURE AND VERIFY EXISTING CONDITIONS AS SHOWN ON THE DRAWINGS. IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES.

G.5 CONTRACTOR SHALL SUPPORT AND PROTECT EXISTING PIPES AND STRUCTURES DURING ALL PHASES OF CONSTRUCTION.

G.6 THE CONTRACTOR SHALL DESIGN AND PROVIDE ALL TEMPORARY AND PERMANENT SUPPORT OF EXCAVATION INCLUDING BUT NOT LIMITED TO SHEETING, SHORING, BRACING, AND/OR UNDERPINNING IN ORDER TO PROTECT EXISTING STRUCTURES, AND UTILITIES FROM EXCESSIVE MOVEMENTS DURING THE CONSTRUCTION PERIOD.

G.7 STRUCTURAL WORK SHALL BE INSPECTED AND TESTED IN CONFORMANCE WITH THE TECHNICAL SPECIFICATIONS.

G.8 IF GROUND WATER IS ENCOUNTERED DURING EXCAVATION, CONTRACTOR SHALL DEWATER EXCAVATION PER SPECIFICATION 02140.

G.9 CONTRACTOR SHALL ANCHOR STRUCTURE AGAINST BUOYANCY FORCES DURING CONSTRUCTION.

G.10 PRIOR TO INSTALLING TEMPORARY SUPPORT OF EXCAVATION AND EXCAVATING, THE CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS SHOWN ON THE DRAWINGS SUCH AS DIMENSIONS, ELEVATIONS, LOCATIONS OF UTILITIES AND UNDERGROUND STRUCTURES.

DESIGN CRITERIA

D.1 SPECIFICATIONS:
- COMMONWEALTH OF MASSACHUSETTS STATE BUILDING CODE, 8TH EDITION.
- AMERICAN CONCRETE INSTITUTE (ACI), 318–08
- AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO), 2010

D.2 LOADINGS:
- ROOF SLAB OF STRUCTURE – AASHTO HS–20–44 (DESIGN TRUCK) LIVE LOAD

REINFORCING STEEL

R.1 REINFORCING STEEL SHALL CONFORM TO ASTM A615 GRADE 60, DEFORMED BARS (U.N.O.), Fy = 60,000 PSI.

R.2 CONCRETE COVER FOR REINFORCEMENT, UNLESS OTHERWISE INDICATED, SHALL BE AS FOLLOWS:
FOOTINGS, FOUNDATIONS, AND OTHER CONCRETE CAST AGAINST EARTH 3"
ALL CONCRETE EXPOSED TO EARTH OR WEATHER 2"

R.3 FOR FOUNDATION WALLS AND FOOTINGS, PROVIDE CORNER BARS AND DOWELS INTO ADJACENT WALLS, FOOTINGS AND SLABS, AS SHOWN ON THE DRAWINGS.

CONCRETE

C.1 CONCRETE WORK AND REINFORCING BAR DETAILS SHALL CONFORM TO THE LATEST ACI STANDARDS, ACI 318, 301, ACI 350 AND ACI SP–66 (DETAILING MANUAL). REFER TO SPECIFICATION SECTION 03300.

C.2 CONCRETE SHALL BE NORMAL WEIGHT AIR ENTRAINED AND SHALL HAVE A SPECIFIED 28 DAY COMPRESSIVE STRENGTH OF 5,000 PSI, UNLESS OTHERWISE NOTED.

C.3 CONCRETE SHALL BE PLACED WITHOUT HORIZONTAL CONSTRUCTION JOINTS UNLESS SHOWN ON THE DRAWINGS OR APPROVED BY THE ENGINEER.

C.4 PROVIDE REINF. SPLICES PER SCHEDULE ON THIS SHEET.

C.5 PROVIDE REINFORCING BAR SUPPORTS, SPACERS AND ACCESSORIES RECOMMENDED IN ACI SP–66, ACI DETAILING MANUAL. PROVIDE PLASTIC–BOOTED ACCESSORIES, SUCH AS SLAB BOLSTERS, AND BEAM AND SLAB CHAIRS IN CONTACT WITH EXPOSED SURFACES. PROVIDE NUMBER 5 BAR MINIMUM FOR SUPPORT BARS.

C.6 PROVIDE ADDITIONAL REINFORCEMENT ALONG EACH SIDE OF OPENINGS, AS INDICATED IN STANDARD DETAILS, UNLESS OTHERWISE INDICATED OR SPECIFIED.

C.7 SET AND TIE ALL REINFORCEMENT BEFORE PLACING CONCRETE. SETTING DOWELS AND REINFORCEMENT INTO WET CONCRETE IS PROHIBITED.

CONCRETE (CONT.)

C.8 PLACE ELEVATED SLABS AND BEAMS MONOLITHICALLY UNLESS OTHERWISE INDICATED OR SPECIFIED.

C.9 ROUGHEN CONCRETE SURFACE TO A FULL AMPLITUDE OF 1/4" AT CONSTRUCTION JOINTS WHERE KEYED JOINTS ARE NOT INDICATED.

C.10 REINFORCING STEEL SHALL BE CONTINUOUS THROUGH CONSTRUCTION JOINTS, UNLESS OTHERWISE INDICATED.

C.11 PROVIDE 3/4" CHAMFER AT ALL EXPOSED EDGES OF CONCRETE, U.N.O.

C.12 CONCRETE FLATWORK SHALL BE WET CURED FOR 7 DAYS, MINIMUM.

C.13 CONCRETE MIX SHALL INCLUDE KRYSTOL INTERNAL MEMBRANE ADMIXTURE OR EQUIVALENT PER MANUFACTURER'S REQUIREMENTS.

C.14 REFER TO SPECIFICATION SECTION 03300, CAST–IN–PLACE CONCRETE.

STRUCTURAL PRECAST NOTES

S1 DETAILED AND CHECKED SHOP DRAWINGS SHOWING ALL STRUCTURAL ELEMENTS, DETAILS AND CONNECTIONS SHALL BE SUBMITTED TO THE OWNER'S ENGINEER/ARCHITECT FOR REVIEW PRIOR TO THE START OF FABRICATION.

S2 THE PRECAST CONCRETE MANUFACTURER SHALL BE RESPONSIBLE FOR FULL COORDINATION OF ALL ELECTRICAL, CIVIL, AND PLUMBING DETAILS AS THEY AFFECT THE STRUCTURAL SYSTEM. CONTRACTOR SHALL VERIFY INSTALLATION AND LOCATIONS OF ALL EMBEDDED ITEMS PRIOR TO CONCRETE PLACEMENT.

S3 THERE SHALL BE NO FIELD CUTTING OF PRECAST ELEMENTS WITHOUT THE PRIOR REVIEW OF THE OWNER'S ENGINEER/ARCHITECT AND SUBSEQUENT WRITTEN CONSENT BY THE PRECAST MANUFACTURER.

S4 ALL DETAILING, FABRICATION, AND PLACING OF REINFORCING BARS SHALL CONFORM TO THE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE", ACI318 AND THE "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", ACI315, LATEST EDITION.

S5 PRECAST UNITS SHALL BE ERECTED WITHOUT EXCEEDING TOLERANCE LIMITS SPECIFIED IN PCI MNL–127.

S6 CONCRETE COMPRESSIVE STRENGTH, f'c = 5,000 PSI, NORMAL WEIGHT CONCRETE.

S7 CONCRETE MIX TO INCLUDE KRYSTOL INTERNAL MEMBRANE ADMIXTURE OR EQUIVALENT PER MANUFACTURER'S REQUIREMENTS.

E8 TOP REINFORCING BARS SHALL BE EPOXY COATED.

MISCELLANEOUS METALS

M1 DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE "STEEL CONSTRUCTION MANUAL", AISC 13TH EDITION, AND 29 CFR PART 1926 SUBPART R – "SAFETY STANDARDS FOR STEEL ERECTION".

M2 STRUCTURAL STEEL SHALL BE NEW STEEL CONFORMING TO THE FOLLOWING:

A. PLATES, BARS, ANGLES AND CHANNELS	ASTM A36, UNO
B. STRUCTURAL TUBING	ASTM A500 GR B
C. ANCHOR RODS	A316 SS
D. WELDING ELECTRODE	E70XX UNLESS NOTED OTHERWISE
E. SHEAR CONNECTORS	ASTM A108

M3 WELDED CONNECTIONS SHALL BE DESIGNED AND DETAILED UTILIZING PREQUALIFIED JOINTS. ALL WELDING SHALL BE PERFORMED BY APPROVED AWS CERTIFIED WELDERS.

M4 STRUCTURAL STEEL FRAMING SHALL BE WITHIN TOLERANCE BEFORE CONNECTIONS ARE FINALLY BOLTED OR WELDED.

M5 FIELD CUTTING OF STRUCTURAL STEEL OR ANY FIELD MODIFICATIONS OF STRUCTURAL STEEL SHALL NOT BE MADE WITHOUT PRIOR WRITTEN APPROVAL BY ENGINEER FOR EACH SPECIFIC CASE.

M6 COMPLY WITH OSHA SAFETY AND HEALTH STANDARDS FOR THE CONSTRUCTION INDUSTRY: 29 CFR PART 1926 SUBPART R – SAFETY STANDARDS FOR STEEL ERECTION.

M7 CONTRACTOR SHALL FIELD VERIFY ALL CONDITIONS, DIMENSIONS, AND ELEVATIONS IN THE FIELD PRIOR TO STEEL FABRICATION.

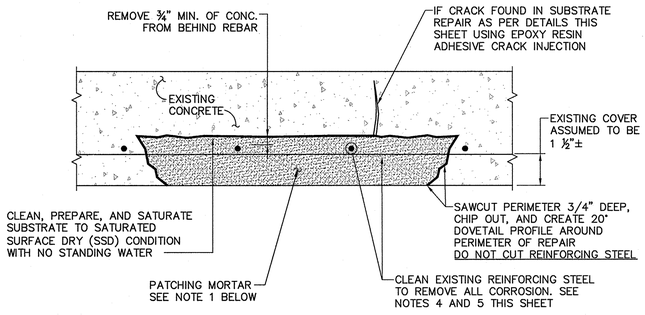
REINFORCEMENT SPLICE TABLES

UNCOATED BARS		
REINFORCEMENT DEVELOPMENT LENGTH Ld AND LAP SPLICE LENGTH Ls		
BAR SIZE	Ld(IN)	Ls(IN)
4	25	33
5	31	41
6	37	49
7	54	71
8	62	81

EPOXY COATED BARS		
REINFORCEMENT DEVELOPMENT LENGTH Ld AND LAP SPLICE LENGTH Ls		
BAR SIZE	Ld(IN)	Ls(IN)
5	47	61
6	56	73
7	81	105
8	93	121

STRUCTURAL ABBREVIATIONS

ADD'L	ADDITIONAL
@	AT
BRNG.	BEARING
BOT.	BOTTOM
CANT.	CANTILEVER
C.I.P.	CAST IN PLACE
℄	CENTER LINE
CONC.	CONCRETE
CONN.	CONNECTION
C.J.	CONSTRUCTION JOINT
CONT.	CONTINUOUS
DIA.	DIAMETER
DWG.	DRAWING
EA.	EACH
E.F.	EACH FACE
E.W.	EACH WAY
EL. or ELEV.	ELEVATION
EMBED.	EMBEDMENT
(E) or EXIST.	EXISTING
EXT.	EXTERIOR
FNDN.	FOUNDATION
GALV.	GALVANIZED
G.C.	GENERAL CONTRAC(OR)
H.P.	HIGH POINT
HORIZ.	HORIZONTAL
H.E.F.	HORIZONTAL EACH FACE
HDG.	HOT DIPPED GALVANIZED
IN.	INCH
L	ANGLE
L.P.	LOW POINT
MAX.	MAXIMUM
MIN.	MINIMUM
(N)	NEW
N.I.C.	NOT IN CONTRACT
N.S.R.G.	NONMETALLIC SHRINK RESISTANT GROUT
N.W.C.	NORMAL WEIGHT CONCRETE
#	NUMBER
O.C.	ON CENTER
PVMT.	PAVEMENT
ℙ	PLATE
±	PLUS OR MINUS
P.A.F.	POWER ACTUATED FASTENERS
REINF.	REINFORCE
REQMTS.	REQUIREMENTS
SPEC.	SPECIFICATION
S.F.	SQUARE FEET
S.O.E.	SUPPORT OF EXCAVATION
STAGG.	STAGGERED
TEMP.	TEMPORARY
T/C	TOP CHORD OF TRUSS
T&B	TOP AND BOTTOM
TOC	TOP OF CONCRETE
TOF	TOP OF FOOTING
TOS	TOP OF SLAB
TOW	TOP OF WALL
TYP.	TYPICAL
U.N.O.	UNLESS NOTED OTHERWISE
(V.I.F.)	VERIFY IN FIELD
V.E.F.	VERTICAL EACH FACE
WSCJ	WATERSTOPPED CONSTRUCTION JOINT
WWF	WELDED WIRE FABRIC



CONCRETE REPAIR DETAIL

REPAIR DETAIL NOTES

1. FOR PATCHING MORTAR USE TAMMS FORM AND POUR BY THE EUCLID CHEMICAL COMPANY, SIKAREPAIR SHA BY SIKA CORPORATION, EMACO 577 CI BY BASF CORPORATION, OR ENGINEER APPROVED EQUAL.
2. ALL SUBSTRATE SURFACES SHALL BE CLEANED, FREE OF DEBRIS AND ROUGHENED PRIOR TO APPLICATION OF REPAIR MATERIAL. APPLY BONDING AGENT TO SUBSTRATE IF PER REPAIR MORTAR MANUFACTURERS REQUIREMENTS.
3. DO NOT CUT OR DAMAGE REINFORCING; NOTIFY ENGINEER IF EXIST. REINFORCING STEEL APPEARS TO HAVE OVER 20% SECTION LOSS. OR TWO ADJACENT BARS HAVE OVER 10% SECTION LOSS. ENGINEER SHALL DETERMINE DURING CONSTRUCTION IF REINFORCING REPAIRS ARE REQUIRED.
4. ALL REBAR THAT IS EXPOSED SHALL BE CLEANED AND COATED WITH A CORROSION INHIBITOR.
5. SPALL REPAIRS SHALL BE "FORM AND POUR" TYPE REPAIR.

CONFORMED SET

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CAMBRIDGE, MASSACHUSETTS

MWH
285 SUMMER STREET, SUITE 200
BOSTON, MASSACHUSETTS 02210
TEL:(617)314–7100

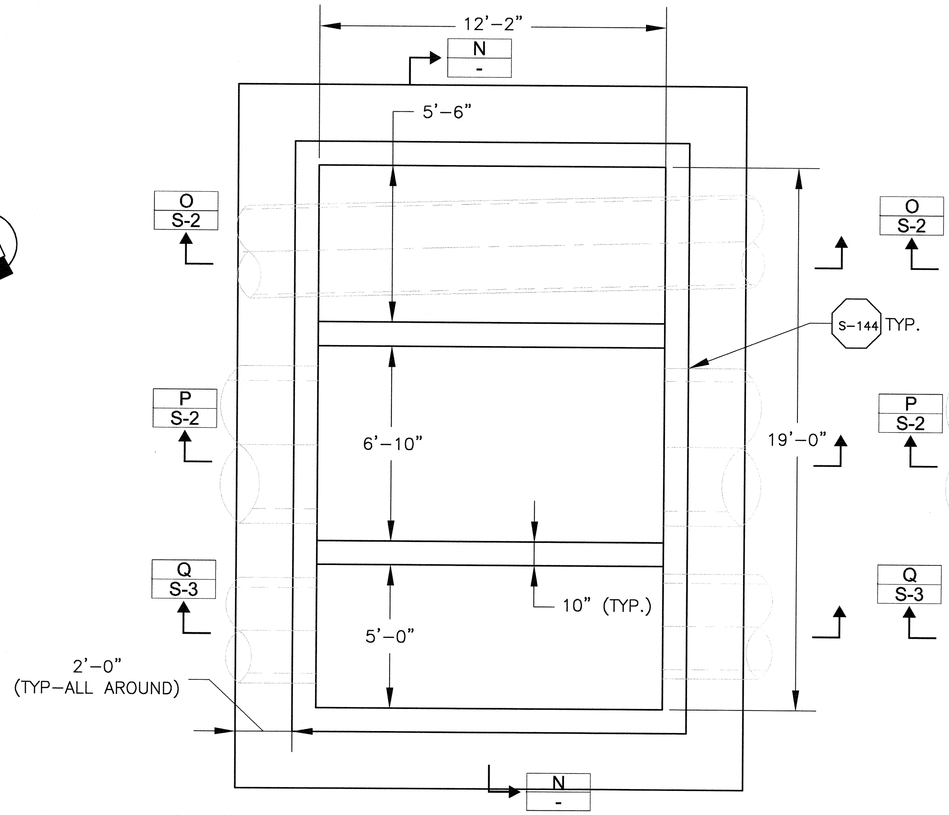
COMMONWEALTH OF MASSACHUSETTS DOUGLAS E. PETERSON STRUCTURAL No. 41845 REGISTERED PROFESSIONAL ENGINEER 1-17-12

Scale	AS NOTED				
Date	SEPTEMBER 2012				
Job No.	2011010.01-A				
Designed by	APL				
Drawn by	JFC				
Checked by	CPS	No.	Description	Date	
Approved by	DEP	REVISIONS			

THE CAMBRIDGE DEPARTMENT OF PUBLIC WORKS

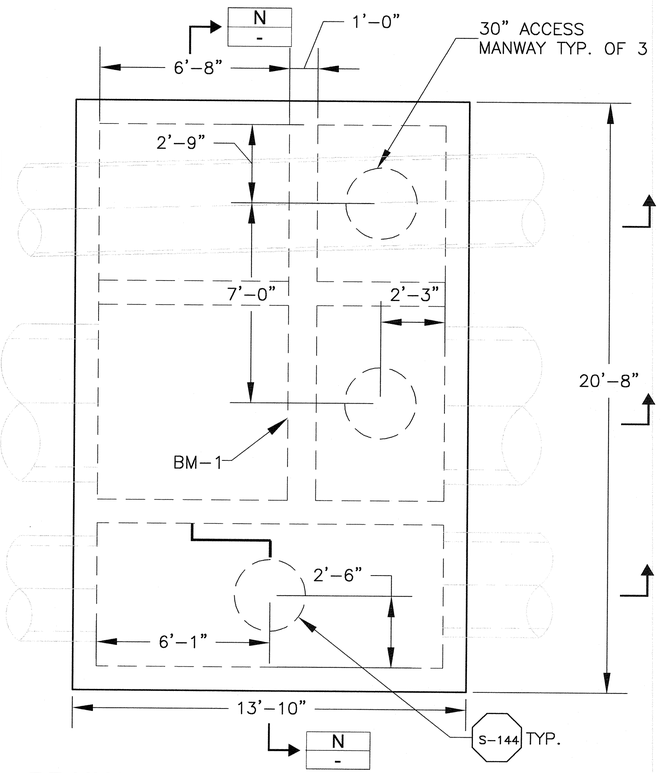
Client: CITY OF CAMBRIDGE, MASSACHUSETTS
Project: HURON A SEWER SEPARATION PROJECT
Contract No. 8A
Drawing: WATER MAIN VAULT
STRUCTURAL GENERAL NOTES AND ABBREVIATIONS

Sheet: SG-4
File No.



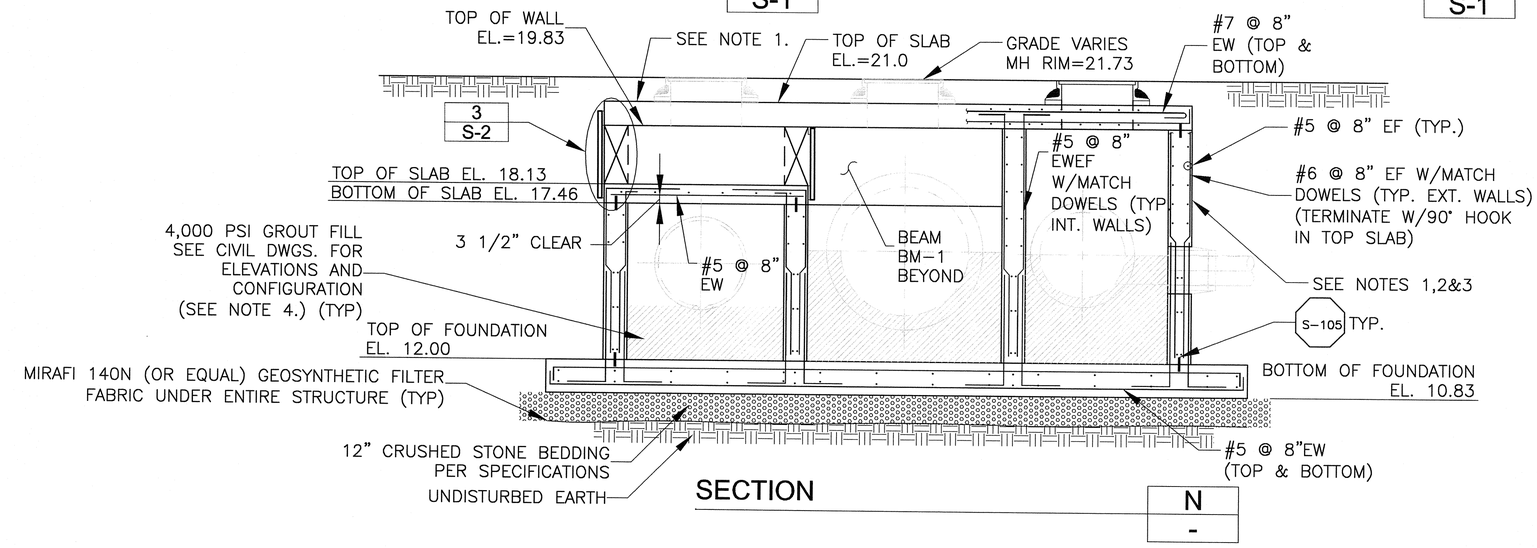
DRAIN VAULT NO.2 FOUNDATION PLAN

1
S-1



DRAIN VAULT NO.2 TOP PLAN

2
S-1



SECTION

N
-

NOTES:

1. FOR CIVIL DETAILS OF VAULT NO. 2, INCLUDING PIPE SIZES, MATERIALS, AND INVERTS, AND MANHOLE FRAMES AND COVERS, SEE SHEET CG-9.

2. APPLY BITUMINOUS DAMPPROOFING PER SPECIFICATION 07160.

3. BACKFILL AROUND STRUCTURE SHALL NOT BE PLACED UNTIL THE TOP SLAB CONCRETE HAS ATTAINED ITS FULL STRENGTH.

4. BACKFILL AROUND STRUCTURE SHALL CONSIST OF CDF PER SPECIFICATION 02210. MAXIMUM UNIT WEIGHT OF CDF SHALL BE LIMITED TO 130 PCF AT TIME OF PLACEMENT. CDF SHALL BE PLACED IN LIFTS OF 3 FEET HEIGHT MAXIMUM WITH A MINIMUM OF 3 DAYS BETWEEN CONSECUTIVE LIFTS.

5. PLACE FILL ONLY AFTER TOP SLAB CONCRETE HAS ATTAINED ITS FULL STRENGTH.

CONFORMED SET

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CAMBRIDGE, MASSACHUSETTS

MWH
285 SUMMER STREET, SUITE 200
BOSTON, MASSACHUSETTS 02210
TEL:(617)314-7100

Scale	3/8"=1'-0"
Date	SEPTEMBER 2012
Job No.	1010691
Designed by	SKJ
Drawn by	AMF
Checked by	MS
Approved by	CPK

No.	Description	Date
	REVISIONS	

THE WORKS
CAMBRIDGE DEPARTMENT OF PUBLIC WORKS

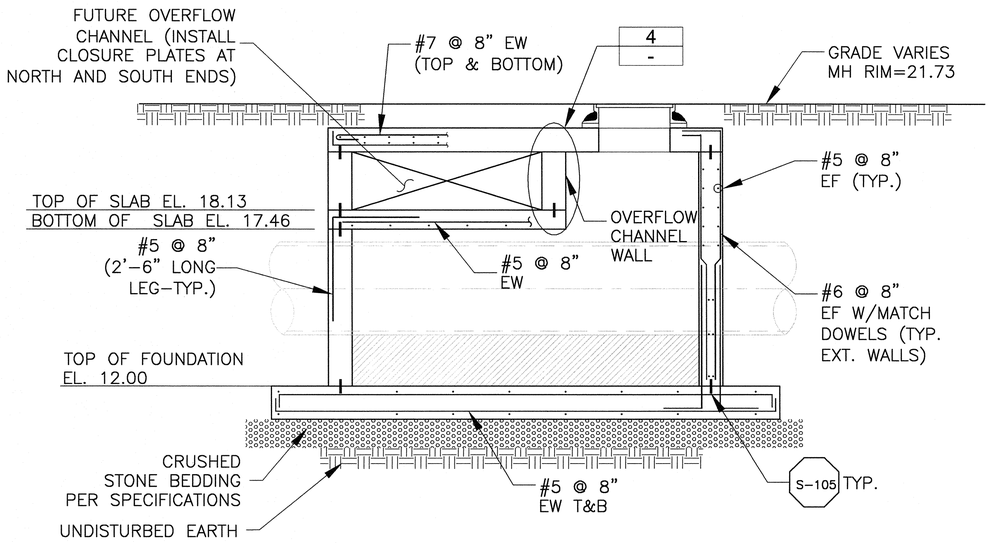
CITY OF CAMBRIDGE, MASSACHUSETTS

HURON A SEWER SEPARATION PROJECT
CONTRACT NO. 8A

STRUCTURAL
DRAIN VAULT NO.2 PLANS AND SECTION

Sheet No. S-1

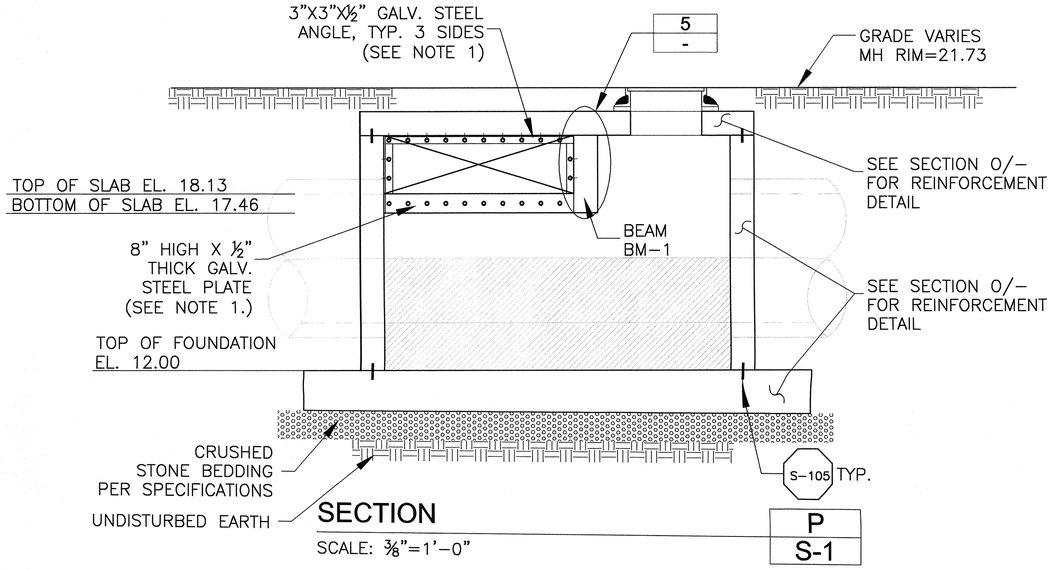
File No.



SECTION

SCALE: 3/8"=1'-0"

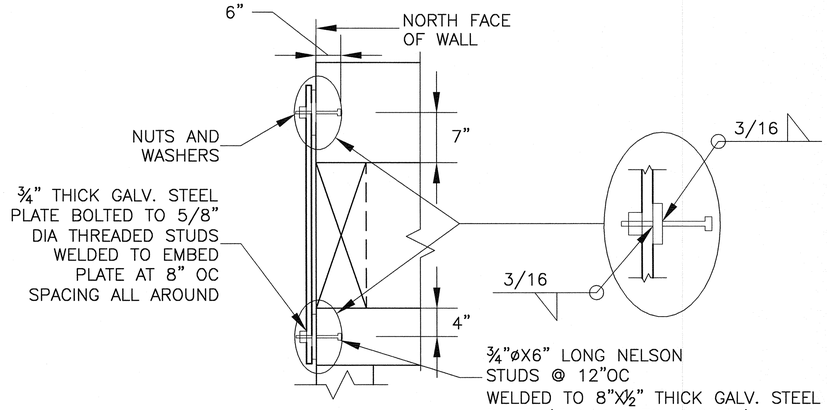
O
S-1



SECTION

SCALE: 3/8"=1'-0"

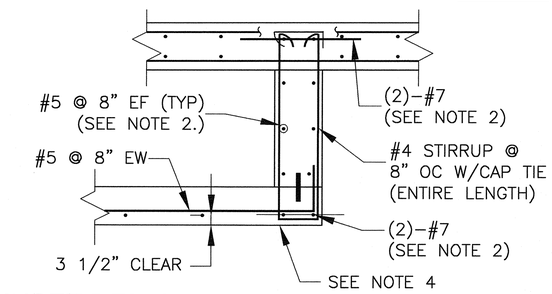
P
S-1



"END PLATE" DETAIL- OUTSIDE OF NORTH WALL

NOT TO SCALE

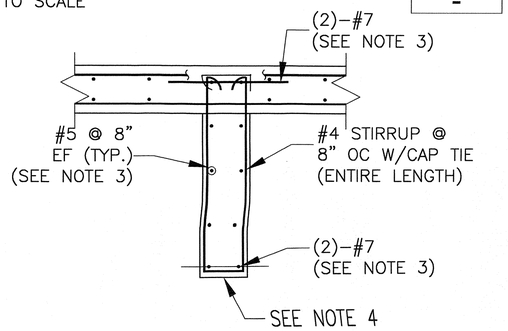
3
S-1



INSET DETAIL

NOT TO SCALE

4
-



INSET DETAIL

NOT TO SCALE

5
-

NOTES:

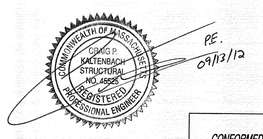
1. STEEL MEMBER SHALL BE BUILT IN WITH CONCRETE VIA ¾"øX6" LONG NELSON STUDS AT 12" OC SPACING AND EMBEDDED IN CONCRETE. ¾" THICK GALV. STEEL FACE PLATE SHALL BE BOLTED TO 5/8" DIA THREADED STUDS WHICH SHALL BE WELDED TO THE STEEL MEMBER AT 8" SPACING ALL AROUND.

2. TERMINATE WITH 90° HOOK AT NORTH END AND EXTEND INTO BEAM BM-1 AT SOUTH END.

3. CONTINUE REINFORCEMENT FROM THE OVERFLOW CHANNEL WALL ON THE NORTHSIDE. TERMINATE WITH 90° HOOK AT SOUTH END.

4. KEEP SHORED TILL TOP SLAB CONCRETE REACHES FULL DESIGN STRENGTH.

5. FOR CIVIL DETAILS OF VAULT NO. 2, INCLUDING PIPE SIZES, MATERIALS, AND INVERTS, AND MANHOLE FRAMES AND COVERS, SEE SHEET CG-9.



CONFORMED SET

KLEINFELDER SEA
Bright People. Right Solutions.
MANCHESTER, NEW HAMPSHIRE ROCKY HILL, CONNECTICUT
CAMBRIDGE, MASSACHUSETTS

MWH
285 SUMMER STREET, SUITE 200
BOSTON, MASSACHUSETTS 02210
TEL:(617)314-7100

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THE WORKS — CAMBRIDGE DEPARTMENT OF PUBLIC WORKS

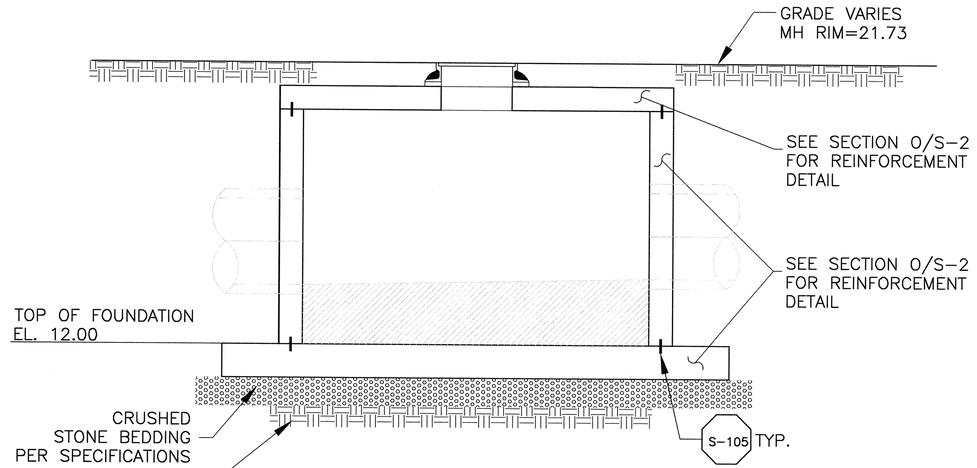
CITY OF CAMBRIDGE, MASSACHUSETTS

HURON A SEWER SEPARATION PROJECT
CONTRACT NO. 8A

STRUCTURAL
DRAIN VAULT NO.2 SECTIONS I

Sheet No. S-2

File No.



SECTION

SCALE: 3/8"=1'-0"

Q
S-1

NOTE:

FOR CIVIL DETAILS OF VAULT NO. 2, INCLUDING PIPE SIZES, MATERIALS, AND INVERTS, AND MANHOLE FRAMES AND COVERS, SEE SHEET CG-9.

COMMONWEALTH OF MASSACHUSETTS
CRAIG P. KALTENBACH
STRUCTURAL
NO. 43005
REGISTERED
PROFESSIONAL ENGINEER
P.E.
01/13/12

CONFORMED SET

KLEINFELDER SEA
MANCHESTER, NEW HAMPSHIRE ROCKY HILL, CONNECTICUT
CAMBRIDGE, MASSACHUSETTS

MWH
285 SUMMER STREET, SUITE 200
BOSTON, MASSACHUSETTS 02210
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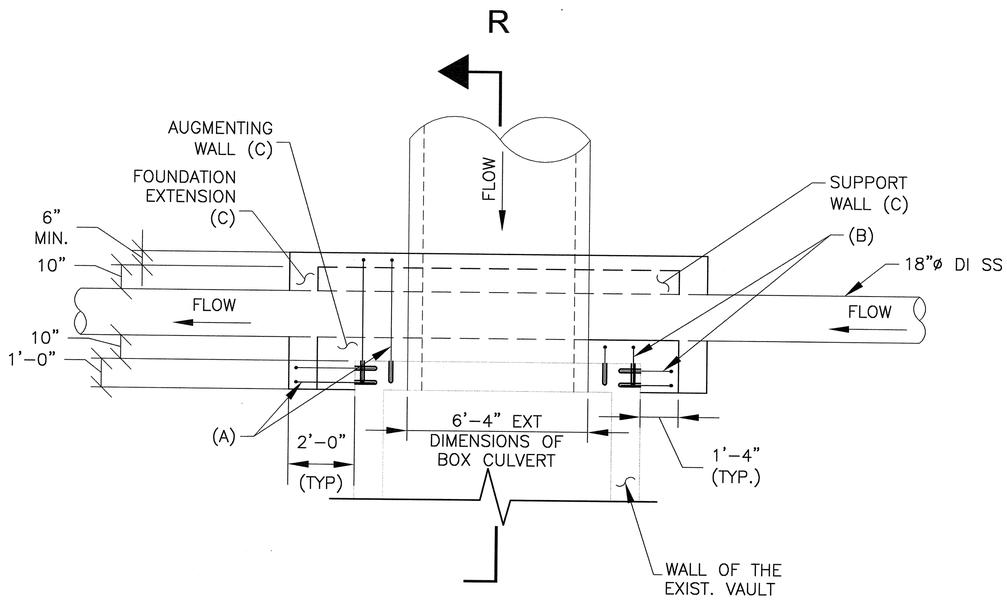
THE WORKS
CAMBRIDGE DEPARTMENT OF PUBLIC

CITY OF CAMBRIDGE, MASSACHUSETTS
HURON A SEWER SEPARATION PROJECT
CONTRACT NO. 8A
STRUCTURAL
DRAIN VAULT NO.2 SECTIONS II

Sheet No. S-3
File No.



36" x 64" BOX CULVERT CONNECTION TO EXIST. JUNCTION VAULT PLAN

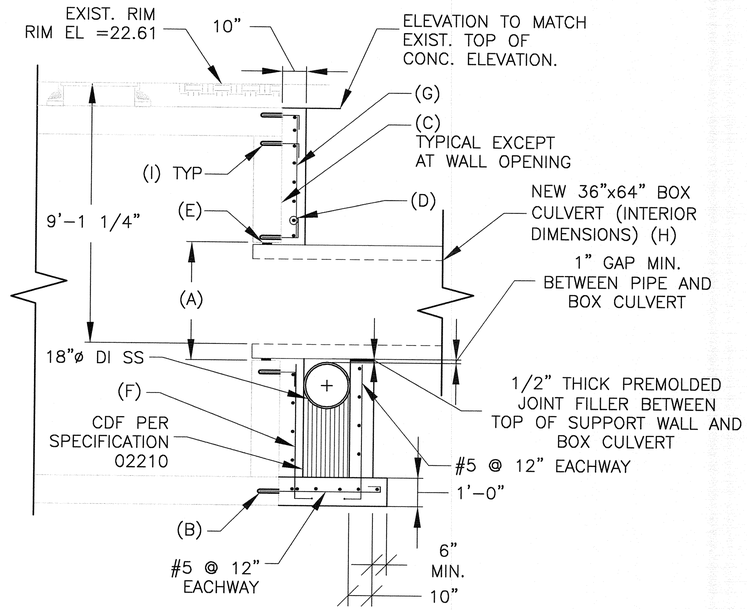
6
-

NOTES:

(A) #5 @ 12" DOWELS FOR FOUNDATION EXTENSION. NOT ALL REQUIRED DOWELS ARE SHOWN.

(B) #5 @ 12" DOWELS FOR AUGMENTING WALL. INSTALL SIMILAR TO FOUNDATION EXTENSION DOWELS. PROVIDE IN MULTIPLE LEVELS AS SHOWN ON SECTION R/–. NOT ALL REQUIRED DOWELS ARE SHOWN.

(C) ALL REQUIRED CONCRETE WORK SHALL BE DONE WITH CLASS A CONCRETE PER SPECIFICATION 03300.



SECTION

R
-

NOTES:

(A) CUT OPENING IN EXISTING VAULT WALL 1" LARGER THAN THE EXTERIOR DIMENSIONS OF THE BOX CULVERT (TYP ON EACH SIDE). REINFORCEMENT BARS IN EXISTING WALL SHALL BE CUT TO FACE OF THIS OPENING.

(B) DRILL 8" DEEP HOLES AT 12" ON CENTER SPACING FOR EPOXY GROUTING #5 DOWELS. INSTALL AT MID THICKNESS OF FOUNDATION.

(C) ROUGHEN EXISTING CONCRETE TO 1/4" AMPLITUDE MINIMUM. APPLY BONDING AGENT.

(D) #5 @ 8" HORIZONTAL REINFORCING. PROVIDE 1'–4" LONG 90° HOOK AT EACH END. TRIM BAR WHERE OPENING IN THE AUGMENTING WALL IS PROVIDED AROUND THE NEW BOX CULVERT.

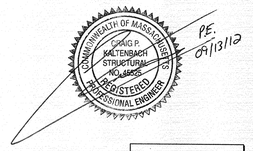
(E) INSTALL HYDROPHILIC WATERSTOP BETWEEN BOX CULVERT AND EXISTING VAULT WALL (TYP ALL AROUND). THE ANNULAR SPACE BETWEEN THE WATERSTOP AND THE VAULT INTERIOR SHALL BE FILLED WITH DRY–PACKED NON–SHRINK GROUT. THE ANNULAR SPACE ON THE OUTSIDE OF THE WATERSTOP SHALL BE FILLED IN WITH CONCRETE AS PART OF THE AUGMENTING WALL CONSTRUCTION.

(F) #5 @ 12" FOUNDATION DOWELS.

(G) #5 @ 12" VERTICAL REINFORCEMENT. LAP TO FOUNDATION DOWELS OUTSIDE OF THE OPENING IN THE AUGMENTING WALL.

(H) BOX CULVERT SHALL SPAN OVER 18"ø DI SS.

(I) #5 @ 12" DOWELS FOR AUGMENTING WALL.



CONFORMED SET

KLEINFELDER Bright People. Right Solutions. ≈ S E A
MANCHESTER, NEW HAMPSHIRE ROCKY HILL, CONNECTICUT
CAMBRIDGE, MASSACHUSETTS

MWH
285 SUMMER STREET, SUITE 200
BOSTON, MASSACHUSETTS 02210
TEL:(617)314–7100

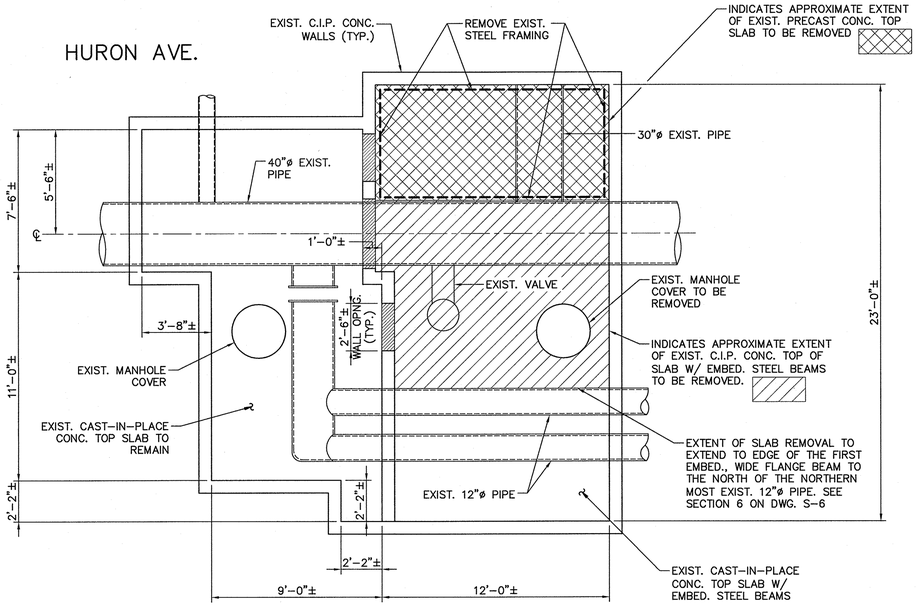
Scale	3/8"=1'-0"
Date	SEPTEMBER 2012
Job No.	1010691
Designed by	SKJ
Drawn by	AMF
Checked by	MS
Approved by	CPK

No.	Description	Date
	REVISIONS	

THE CAMBRIDGE DEPARTMENT OF PUBLIC WORKS

CITY OF CAMBRIDGE, MASSACHUSETTS
HURON A SEWER SEPARATION PROJECT
CONTRACT NO. 8A
STRUCTURAL - 36" X 64" BOX CULVERT CONNECTION TO EXISTING JUNCTION VAULT PLAN AND SECTION

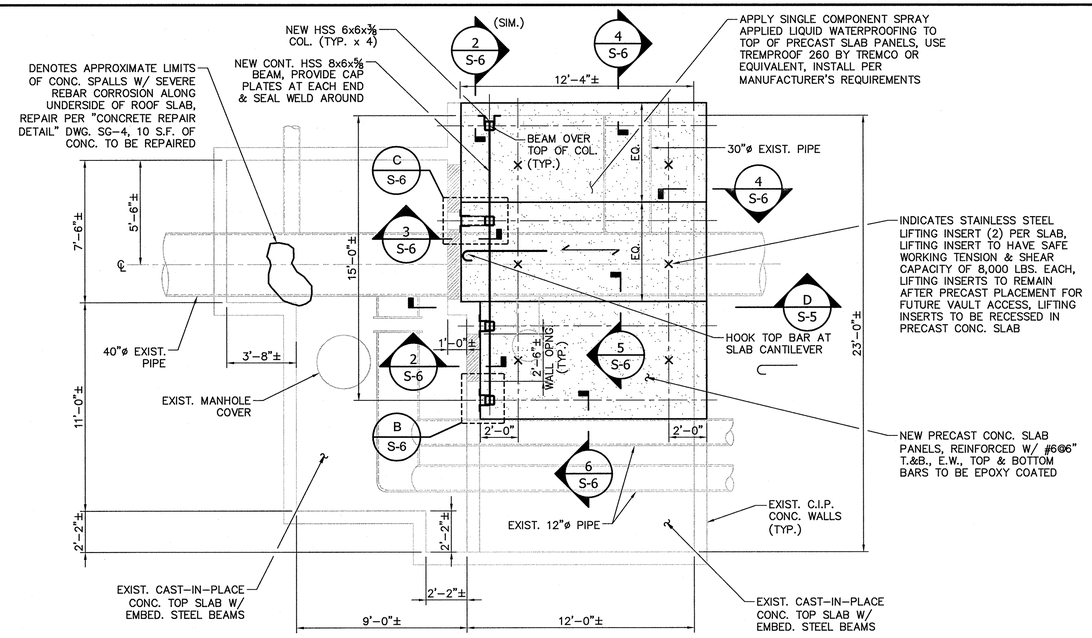
Sheet No. S-4
File No.



WATER MAIN VAULT TOP SLAB DEMO PLAN

Scale: 1/4"=1'-0"

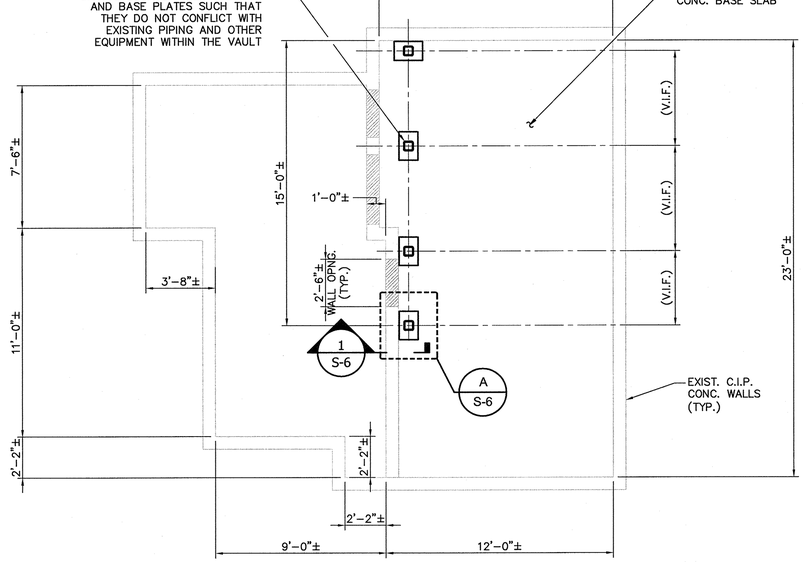
NOTE: CONTRACTOR TO FIELD VERIFY ALL EXISTING DIMENSIONS PRIOR TO CONSTRUCTION.



WATER MAIN VAULT NEW TOP SLAB PLAN

Scale: 1/4"=1'-0"

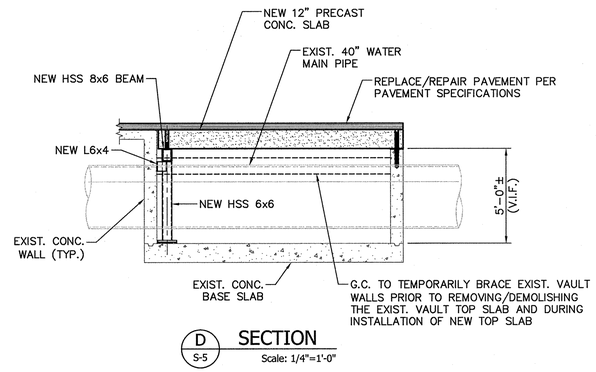
NOTE: CONTRACTOR TO FIELD VERIFY ALL EXISTING DIMENSIONS PRIOR TO CONSTRUCTION.



WATER MAIN VAULT BASE SLAB PLAN

Scale: 1/4"=1'-0"

NOTE: CONTRACTOR TO FIELD VERIFY ALL EXISTING DIMENSIONS PRIOR TO CONSTRUCTION.



D S-5 SECTION

Scale: 1/4"=1'-0"

NOTES:

1. REFER TO SHEET SG-4 FOR STRUCTURAL GENERAL NOTES AND TYPICAL DETAILS. RELATED TO WATER MAIN VAULT WORK.
2. CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO STEEL AND PRECAST FABRICATION.
3. ALL PRECAST REINFORCING BARS TO BE EPOXY COATED.

SUGGESTED CONSTRUCTION SEQUENCING (CONSTRUCTION SEQUENCING IS THE SOLE RESPONSIBILITY OF THE GENERAL CONTRACTOR):

1. LOWER THE EXISTING GROUND WATER LEVEL WITHIN THE VAULT PRIOR TO CONSTRUCTION AND REMOVE WATER AND DEBRIS ON THE FLOOR SURFACE OF THE BASE SLAB.
2. TEMPORARILY BRACE EXISTING VAULT WALLS PRIOR TO REMOVING/DEMOLISHING THE EXISTING VAULT TOP SLAB AND DURING INSTALLATION OF NEW TOP SLAB.
3. REMOVE/DEMO EXISTING VAULT TOP SLAB.
4. INSTALL NEW PRECAST CONCRETE VAULT TOP SLAB.

CONFORMED SET

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MANCHESTER, NEW HAMPSHIRE ROCKY HILL, CONNECTICUT
CAMBRIDGE, MASSACHUSETTS

MWH
285 SUMMER STREET, SUITE 200
BOSTON, MASSACHUSETTS 02210
TEL:(617)314-7100

COMMONWEALTH OF MASSACHUSETTS
DOUGLAS E. PETERSON
STRUCTURAL
No. 41846
REGISTERED PROFESSIONAL ENGINEER
9-19-12

Scale	AS NOTED
Date	SEPTEMBER 2012
Job No.	2011010.01-A
Designed by	APL
Drawn by	JFC
Checked by	CPS
Approved by	DEP

No.	Description	Date
	REVISIONS	

THE WORKS — CAMBRIDGE DEPARTMENT OF PUBLIC WORKS

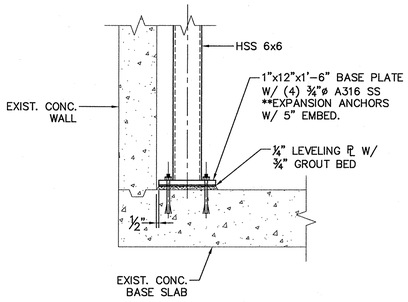
Client: CITY OF CAMBRIDGE, MASSACHUSETTS

Project: HURON A SEWER SEPARATION PROJECT
Contract No. 8A

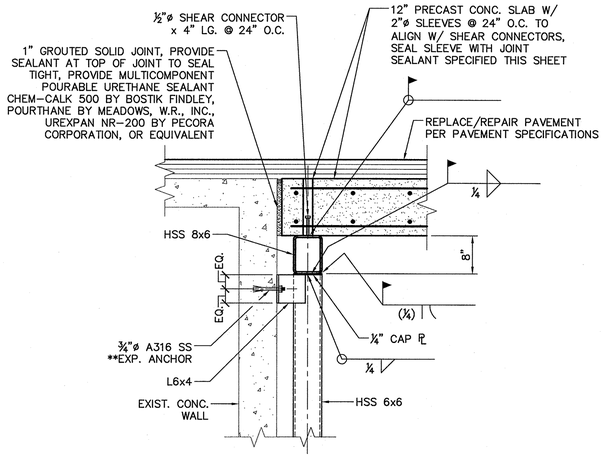
Drawing: WATER MAIN VAULT
STRUCTURAL PLANS

Sheet: S-5

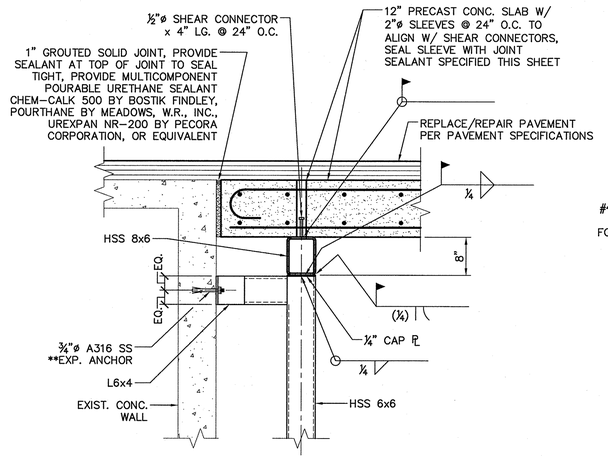
File No.



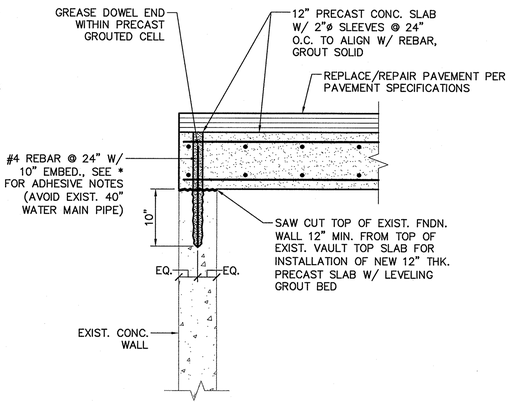
1 S-5 SECTION
Scale: 3/4"=1'-0"



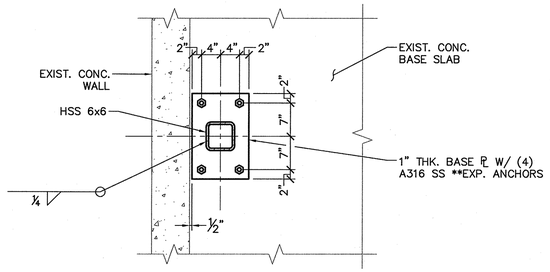
2 S-5 SECTION
Scale: 3/4"=1'-0"



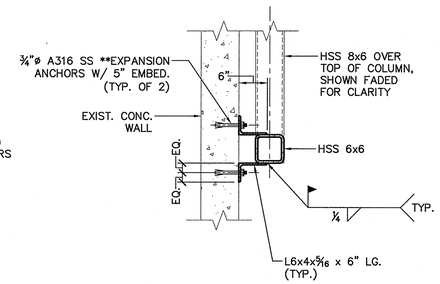
3 S-5 SECTION
Scale: 3/4"=1'-0"



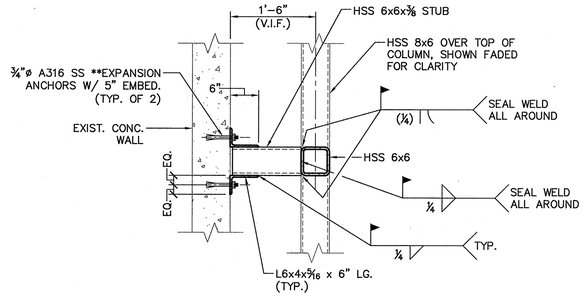
4 S-5 SECTION
Scale: 3/4"=1'-0"



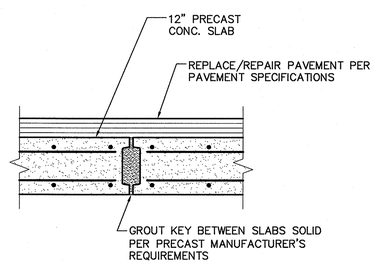
A S-5 PLAN DETAIL
Scale: 3/4"=1'-0"



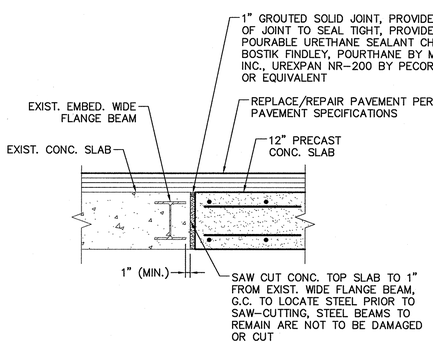
B S-5 PLAN DETAIL
Scale: 3/4"=1'-0"



C S-5 PLAN DETAIL
Scale: 3/4"=1'-0"



5 S-5 SECTION
Scale: 3/4"=1'-0"



6 S-5 SECTION
Scale: 3/4"=1'-0"

NOTES:

1. ALL BARS IN PRECAST SLAB TO BE EPOXY COATED.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING PRIOR TO AND DURING CONSTRUCTION.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR TEMPORARY BRACING AND SHORING OF EXISTING VAULT STRUCTURE TO REMAIN. ALL NECESSARY BRACING AND SHORING SHALL BE INSTALLED PRIOR TO REMOVAL TOP SLAB.
4. ALL STEEL SHALL BE PAINTED WITH EPOXY PAINT SERIES 66 BY TNEMEC OR APPROVED EQUAL PER MANUFACTURER'S REQUIREMENTS AND THE FOLLOWING:
   i) COMMERCIAL BLAST CLEAN (SSPC-SP-6) ALL FERROUS METALS, INCLUDING FIELD WELDS AND UNPRIMED SHOP WELDS, WITHOUT SHOP PRIME COAT. USE NEEDLE GUN FOR FIELD WELDS AND SHOP WELDS WHICH OCCUR IN NARROW UNPRIMED AREAS IN AN OTHERWISE SHOP PRIMED SURFACE FOLLOWED BY SSPC-SP1-SOLVENT WIPE.
   ii) PRIME CLEANED STEEL PER MANUFACTURER'S REQUIREMENTS FOR PAINT FINISH.
   iii) PAINT STEEL WITH TWO COATS OF 4.0-6.0 MILS IN THE SHOP.
   iv) HOLD BACK SHOP PRIMER AND PAINT IN AREAS TO BE FIELD WELDED. GRIND WELDS SMOOTH AND APPLY PRIMER AND PAINT IN FIELD PER ABOVE PROCEDURE.

* DRILLED AND DOWELED REBAR SHALL BE INSTALLED WITH EPOXY ADHESIVE HIT-RE 500 SD BY HILTI, SET-XP BY SIMPSON, PE1000+ BY POWERS, OR ENGINEER APPROVED EQUAL.

** EXPANSION ANCHORS TO BE KWIK BOLT TZ BY HILTI, STRONG BOLT 2 BY SIMPSON, ANKR-TITE BY WEJ-IT, OR ENGINEER APPROVED EQUAL.

CONFORMED SET

KLEINFELDER Bright People. Right Solutions. SEA
MANCHESTER, NEW HAMPSHIRE ROCKY HILL, CONNECTICUT
CAMBRIDGE, MASSACHUSETTS

MWH
285 SUMMER STREET, SUITE 200
BOSTON, MASSACHUSETTS 02210
TEL:(617)314-7100

COMMONWEALTH OF MASSACHUSETTS — DOUGLAS E. PETERSON STRUCTURAL No. 41846 REGISTERED PROFESSIONAL ENGINEER — 9-17-12

Scale	AS NOTED
Date	SEPTEMBER 2012
Job No.	2011010.01-A
Designed by	APL
Drawn by	JFC
Checked by	CPS
Approved by	DEP

No.	Description	Date
	REVISIONS	

THE WORKS — CAMBRIDGE DEPARTMENT OF PUBLIC WORKS

Client: CITY OF CAMBRIDGE, MASSACHUSETTS
Project: HURON A SEWER SEPARATION PROJECT
Contract No. 8A
Drawing: WATER MAIN VAULT
STRUCTURAL SECTIONS AND DETAILS
Sheet: S-6
File No.

PERMANANT SIGNAGE

ID #	SIZE OF SIGN (IN)		TEXT	TEXT DIMENSIONS			NUMBERS OF SIGNS REQUIRED	COLOR			POST SIZE	UNIT AREA (S.F.)	TOTAL AREA (S.F.)
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACK-GROUND	LEGEND	BORDER			
R1-1	30	30	STOP	(1)	(1)	(1)	23	RED	WHITE	WHITE	P5	4.86	111.78
R5-1	30	30	DO NOT ENTER				14	RED	WHITE	WHITE	P5	6.25	87.50
R6-1	36	12	ONE WAY				13	BLACK	WHITE	WHITE	P5	3.00	39.00
R6-2	24	30	ONE WAY				8	WHITE	BLACK	BLACK	P5	5.00	40.00
S4-3	24	8	SCHOOL				1	YELLOW	BLACK	BLACK	P5	1.33	1.33
S5-1	24	48	SCHOOL SPEED LIMIT 20 WHEN FLASHING				1	WHITE/ YELLOW	BLACK	BLACK	P5	8.00	8.00
S5-2	24	30	END SCHOOL ZONE				1	WHITE	BLACK	BLACK	P5	5.00	5.00
OM4-1	25	49					2	WHITE/ YELLOW	BLACK	BLACK	P5	9.00	9.00
W6-3	30	30					2	YELLOW	BLACK	BLACK	P5	4.86	9.72
W14-1	30	30	DEAD END				4	YELLOW	BLACK	BLACK	P5	4.86	19.44
W15-1	30	30					1	YELLOW	BLACK	BLACK	P5	4.86	4.86
D3-1	24	9	LARCH RD PBS				3	GREEN	WHITE	WHITE	P5	1.50	4.50
D3-2	24	9	POPLAR RD PBS				1	GREEN	WHITE	WHITE	P5	1.50	1.50
D3-3	30	9	HAWTHORNE PK PBS				1	GREEN	WHITE	WHITE	P5	1.88	1.88
D3-4	30	9	FRESH POND PKWY PBS				2	GREEN	WHITE	WHITE	P5	1.88	3.76
D3-5	24	9	GROZIER RD PBS				2	GREEN	WHITE	WHITE	P5	1.50	3.00
D3-6	24	9	MALCOLM RD PBS				2	GREEN	WHITE	WHITE	P5	1.50	3.00
D3-7	30	9	LEXINGTON AVE PBS				2	GREEN	WHITE	WHITE	P5	1.88	3.76
D3-8	30	9	WORTHINGTON ST PBS				2	GREEN	WHITE	WHITE	P5	1.88	3.76
D3-9	24	9	STANDISH ST PBS				2	GREEN	WHITE	WHITE	P5	1.50	3.00
D3-10	30	9	LAKEVIEW AVE PBS				1	GREEN	WHITE	WHITE	P5	1.88	1.88
D3-11	24	9	VASSAL LN PBS				1	GREEN	WHITE	WHITE	P5	1.50	1.50
D3-12	30	9	GRACEWOOD PK PBS				1	GREEN	WHITE	WHITE	P5	1.88	1.88

PERMANANT SIGNAGE (CONT.)

ID #	SIZE OF SIGN (IN)		TEXT	TEXT DIMENSIONS			NUMBERS OF SIGNS REQUIRED	COLOR			POST SIZE	UNIT AREA (S.F.)	TOTAL AREA (S.F.)
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR.		BACK-GROUND	LEGEND	BORDER			
CT-110	12	18	SEE APPENDIX G	(2)	(2)	(2)	22	WHITE	RED	RED	P5	1.50	33.00
CT-180	12	18	SEE APPENDIX G				5	WHITE	RED	RED	P5	1.50	7.50
CT-199	12	18	SEE APPENDIX G				22	RED/ WHITE	WHITE/ BLUE	WHITE	P5	1.50	33.00
CT-220 (4T)	24	18	SEE APPENDIX G				80	WHITE	RED	RED	P5	3.00	240.00
CT-220 (4W)	24	18	SEE APPENDIX G				81	WHITE	RED	RED	P5	3.00	243.00
CT-390 (4T)	12	18	SEE APPENDIX G				3	WHITE	RED	RED	P5	1.50	4.50
CT-390 (4W)	12	18	SEE APPENDIX G				5	WHITE	RED	RED	P5	1.50	7.50
CT-600	30 21	30 15	SEE APPENDIX G				2	YELLOW	BLACK	BLACK	P5	8.44	16.88
CT-800	12	18	SEE APPENDIX G				2	WHITE/ BLUE	GREEN/ WHITE	GREEN	P5	1.50	3.00

NOTES:
1. ALL STOP SIGNS PROPOSED IN THIS CONTRACT ARE SUBJECT TO FIELD INVESTIGATION BY THE CITY OF CAMBRIDGE TO JUSTIFY WARRANTS BEFORE INSTALLATION.
2. HIGH INTENSITY ENCAPSULATED LENS RELECTIVE SHEETING SHALL BE USED FOR ALL SIGNS. THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" 2009 EDITION, THE 1996 "MASSDOT CONSTRUCTION AND TRAFFIC STANDARD DETAILS," AND ALL AMENDEMENTS WILL GOVERN.
3. PBS = PRINT BOTH SIDES
4. (1) SEE MUTCD 2009 EDITION, 1979 STD. HWY. SIGNS AND SECTION M9.30.0 TYPE III OF THE MASSDOT STANDARD SPECIFICATION FOR TEXT DIMENSIONS AND COLOR.
   (2) SEE CITY OF CAMBRIDGE STANDARD SPECIFICATION FOR TEXT DIMENSIONS AND COLOR, PROVIDED IN APPENDIX G.
5. FOR SIGNS CT-210 AND CT-390, 4W REFERS TO STREET CLEANING ON THE FOURTH WEDNESDAY OF THE MONTH AND 4T REFERS TO THE FOURTH TUESDAY.

CONFORMED SET

KLEINFELDER Bright People. Right Solutions. SEA
MANCHESTER, NEW HAMPSHIRE ROCKY HILL, CONNECTICUT
CAMBRIDGE, MASSACHUSETTS

MWH
285 SUMMER STREET, SUITE 200
BOSTON, MASSACHUSETTS 02210
TEL:(617)314-7100

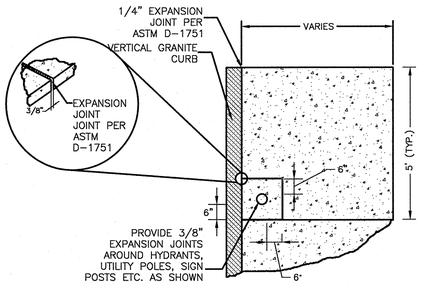
COMMONWEALTH OF MASSACHUSETTS JOHN J. STRUZZIERY No. 30431 REGISTERED PROFESSIONAL ENGINEER 9/13/12

Scale	AS NOTED
Date	SEPTEMBER 2012
Job No.	2011010.01-A
Designed by	TAL/JL
Drawn by	TAL/JL
Checked by	CMC/BJM
Approved by	BJM

No.	Description	Date
	REVISIONS	

THE WORKS CAMBRIDGE DEPARTMENT OF PUBLIC WORKS

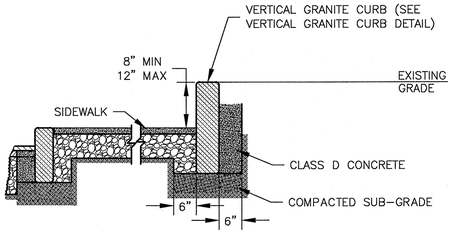
Client: CITY OF CAMBRIDGE, MASSACHUSETTS
Project: HURON A SEWER SEPARATION PROJECT Contract No. 8A
Drawing: PERMANENT SIGNAGE DETAILS
Sheet: RG-1
File No.



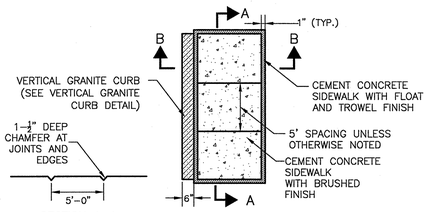
NOTES:

1. EXPANSION JOINTS SHALL BE INSTALLED AT BACK OF SIDEWALK STEPS, WALLS, BUILDINGS, AND OTHER STRUCTURES.
2. EXPANSION JOINTS AT BUILDINGS SHALL BE CAULKED.
3. EXPANSION JOINTS SHALL BE USED AT TRANSITIONS BETWEEN NEW AND EXISTING SIDEWALK JOINTS.
4. EXPANSION JOINTS OF 3/8-IN THICK FOAM SHALL BE PLACED EVERY 30 FEET PERPENDICULAR TO CURB ALIGNMENT EXTENDING THROUGH THE SIDEWALK DEPTH. SEE SECTION 02524-3.2C OF THE CONTRACT DOCUMENTS.

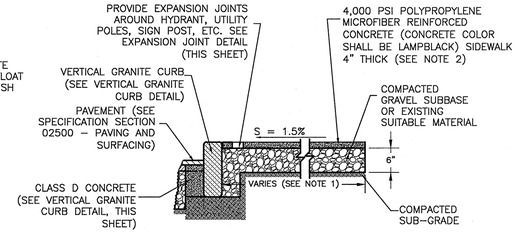
EXPANSION JOINT DETAIL



VERTICAL GRANITE CURB DETAIL
FOR BACK OF SIDEWALK CURB



SECTION A-A PLAN

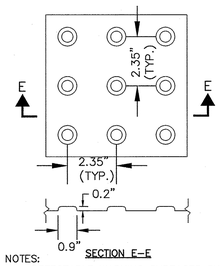


SECTION B-B

NOTES:

1. NEW SIDEWALK SHALL MATCH WIDTH OF EXISTING SIDEWALK UNLESS OTHERWISE NOTED.
2. SIDEWALK MATERIAL TO MATCH EXISTING SIDEWALK. FOR EXISTING ASPHALT SIDEWALK, SUBSTITUTE 4" CONCRETE.
3. AROUND HYDRANTS, UTILITY POLES SIGN POSTS ETC., SEE EXPANSION JOINT DETAIL (THIS SHEET).
4. SIDEWALKS TO BE BUILT ACCORDING TO ADA AND MA AAB REGULATIONS, 2.0% MAX (0% TOLERANCE) CROSS SLOPE.
5. SEE ROADWAY PLANS FOR SIDEWALK WIDTHS AND GRADES.

CONCRETE SIDEWALK DETAIL

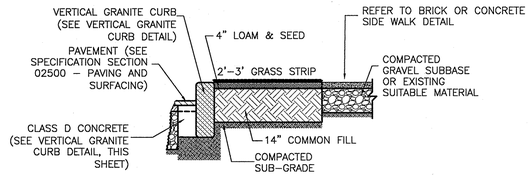


SECTION E-E

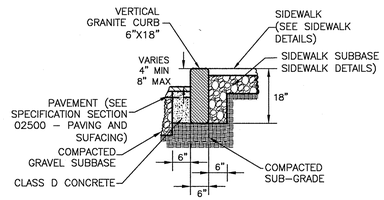
NOTES:

1. DETECTABLE WARNING SURFACES SHALL CONTRAST VISUALLY WITH ADJACENT WALKING SURFACES EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT.
2. DETECTABLE WARNING PANELS SHALL EXTEND A MIN. OF 2' IN RAMP AND BE CONSTRUCTED OF CAST IRON.

DETECTABLE WARNING PANEL DETAIL



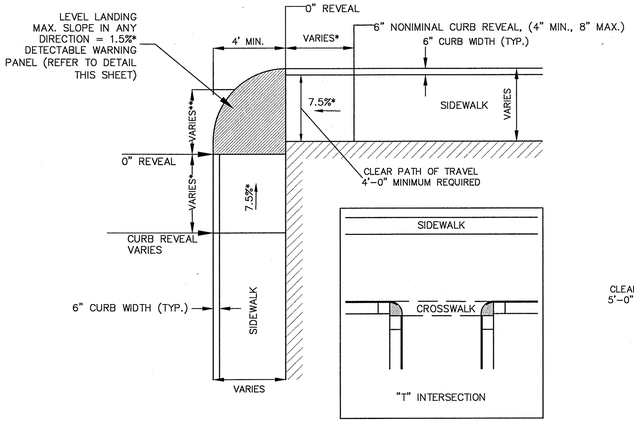
SIDEWALK GRASS STRIP DETAIL



NOTES:
1. SEE CIVIL GRADING AND RESTORATION PLANS AND CROSS SECTION SHEETS FOR SIDEWALK GRADES.

BRICK SIDEWALK DETAIL

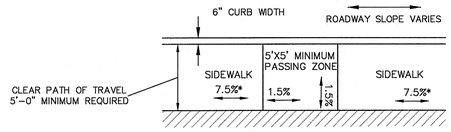
VERTICAL GRANITE CURB DETAIL



LEGEND

- BUILDING OR OTHER UNALTERABLE CONDITION
- * FOR CURB TRANSITION LENGTHS, REFER TO TRANSITION CHART, THIS SHEET
- ** RAMP WIDTHS VARY 3'-0" - 5'-4". REFER TO CURB TIE PLANS FOR RAMP WIDTHS

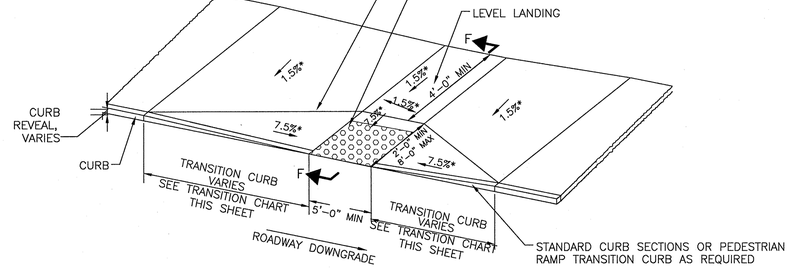
"T" INTERSECTION PEDESTRIAN RAMP DETAIL



5'x5' MINIMUM LEVEL PASSING ZONE

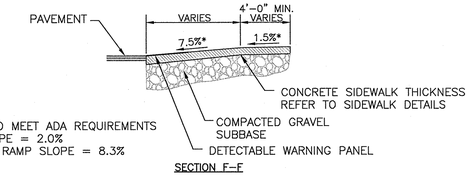
NOTES:

* CONTRACTOR TO MEET ADA REQUIREMENTS
MAXIMUM CROSS SLOPE = 2.0%
MAXIMUM TRANSITION RAMP SLOPE = 8.3%



TRANSITION CHART

ROADWAY PROFILE GRADE	LENGHTH OF CURB
0.00	6'-6"
>0.00 TO 0.01	7'-8"
>0.01 TO 0.02	9'-0"
>0.02 TO 0.03	11'-0"
>0.03 TO 0.04	14'-0"
>0.04	15'-0" MAX.



SECTION F-F

NOTES:

* CONTRACTOR TO MEET ADA REQUIREMENTS
MAXIMUM CROSS SLOPE = 2.0%
MAXIMUM TRANSITION RAMP SLOPE = 8.3%

PEDESTRIAN RAMP DETAIL

CONFORMED SET

KLEINFELDER Bright People. Right Solutions. SEA
MANCHESTER, NEW HAMPSHIRE ROCKY HILL, CONNECTICUT
CAMBRIDGE, MASSACHUSETTS

MWH
285 SUMMER STREET, SUITE 200
BOSTON, MASSACHUSETTS 02210
TEL:(617)314-7100

COMMONWEALTH OF MASSACHUSETTS — JOHN J. STRUZZIERY No. 30464 — REGISTERED PROFESSIONAL ENGINEER — 5/13/12

Scale	AS NOTED			
Date	SEPTEMBER 2012			
Job No.	2011010.01-A			
Designed by	TAL/JL			
Drawn by	TAL/JL			
Checked by	CMC/BJM	No.	Description	Date
Approved by	BJM		REVISIONS	

THE CAMBRIDGE DEPARTMENT OF PUBLIC WORKS

Client: CITY OF CAMBRIDGE, MASSACHUSETTS
Project: HURON A SEWER SEPARATION PROJECT
Contract No. 8A
Drawing: ROADWAY GENERAL
Curb and Sidewalk Details

Sheet: RG-2
File No.

PAVEMENT NOTES

PROPOSED ROADWAY PULVERIZING

DEPTH OF BLADE: 8"

SURFACE: 2" HOT MIX ASPHALT TOP COURSE
4" HOT MIX ASPHALT BASE COURSE

SUBBASE: 2" (MAX) PULVERIZED MATERIAL

COLD PLANE AND OVERLAY

COLD PLANE: 2"

OVERLAY: 2" HOT MIX ASPHALT TOP COURSE

TACKCOAT: BITUMEN FOR TACK COAT (RS-1) AT 1/20 GAL/SY
OVER COLD PLANED SURFACE

PROPOSED CEMENT CONCRETE SIDEWALK & PEDESTRIAN RAMPS

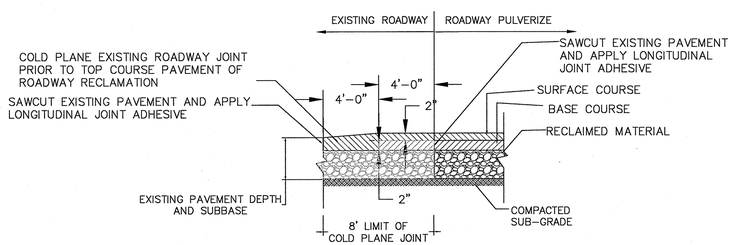
SURFACE: 4" AIR-ENTRAINED 4,000 PSI, 3/4", 610 CEMENT CONCRETE (COLOR LAMPBLACK)
LAID IN ONE (1) LAYER

SUBBASE: 8" GRAVEL BORROW, TYPE C

PROPOSED CEMENT CONCRETE DRIVEWAYS & CEMENT CONCRETE SIDEWALKS AT DRIVEWAYS

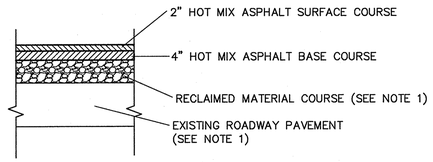
SURFACE: 6" AIR-ENTRAINED 4,000 PSI, 3/4", 610 CEMENT CONCRETE (COLOR LAMPBLACK)
LAID IN ONE (1) LAYER

SUBBASE: 8" GRAVEL BORROW, TYPE C



NOTES:
1. CLEAN ALL COLD PLANED SURFACES BEFORE APPLYING JOINT ADHESIVE AND FINAL PAVEMENT

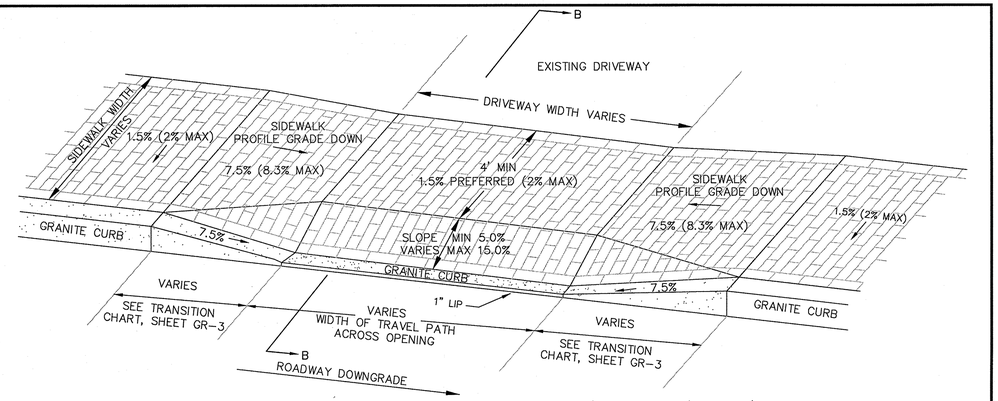
PAVEMENT JOINT DETAIL IN PULVERIZING AREAS



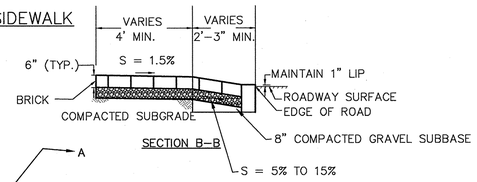
NOTES:

1. RECLAIMED MATERIAL COURSE SHALL BE MINIMUM 2" DEPTH. EXISTING ROADWAY PAVEMENT SHALL BE PLANED AS REQUIRED IN ORDER TO PROVIDE MINIMUM 2" DEPTH FOR THE RECLAIMED MATERIAL COURSE.

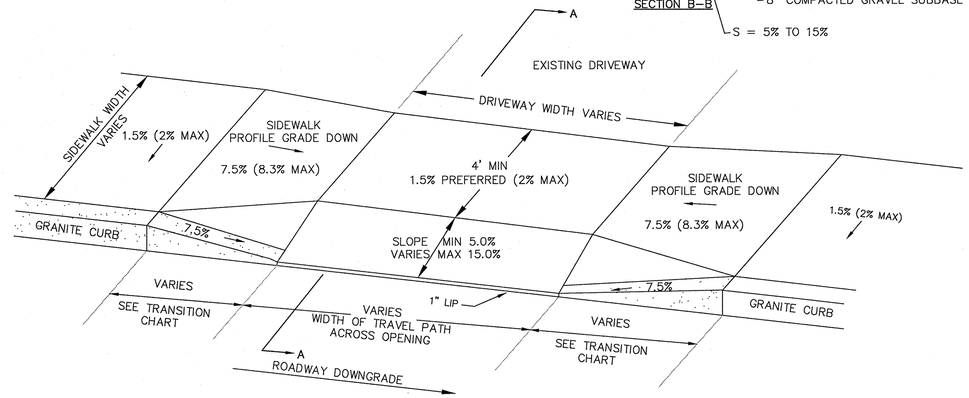
PAVEMENT DETAIL



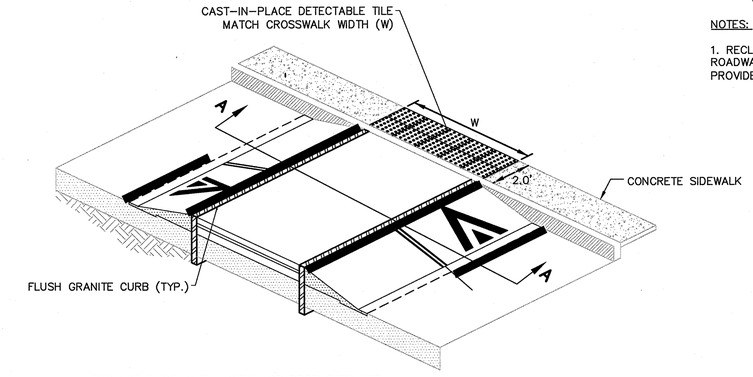
BRICK DRIVEWAY DETAIL AT SIDEWALK



SECTION B-B

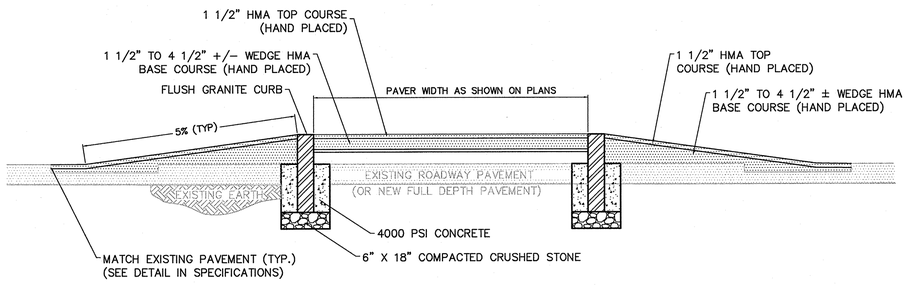


CONCRETE DRIVEWAY DETAIL AT SIDEWALK



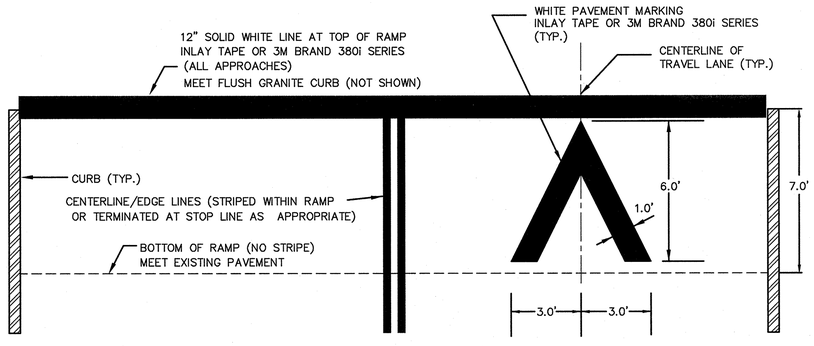
* REPLACE EXISTING TRANSITION OR DROP CURB WITH FULL VERTICAL CURB AS REQUIRED.

ISOMETRIC PLAN

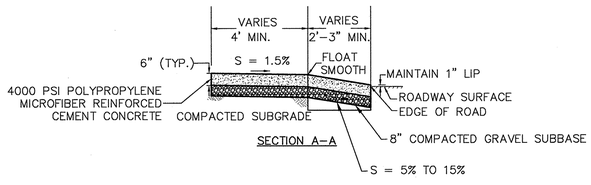


SECTION A-A

RAISED CROSS WALK DETAILS
(RAISED INTERSECTION IS SIMILAR)



RAMP MARKING DETAIL
NTS



SECTION A-A

TRANSITION CHART

ROADWAY PROFILE GRADE	LENGHTH OF CURB
0.00	6'-6"
>0.00 TO 0.01	7'-8"
>0.01 TO 0.02	9'-0"
>0.02 TO 0.03	11'-0"
>0.03 TO 0.04	14'-0"
>0.04	15'-0" MAX.

CONFORMED SET

KLEINFELDER ▪ S E A
Bright People. Right Solutions.
MANCHESTER, NEW HAMPSHIRE ROCKY HILL, CONNECTICUT
CAMBRIDGE, MASSACHUSETTS

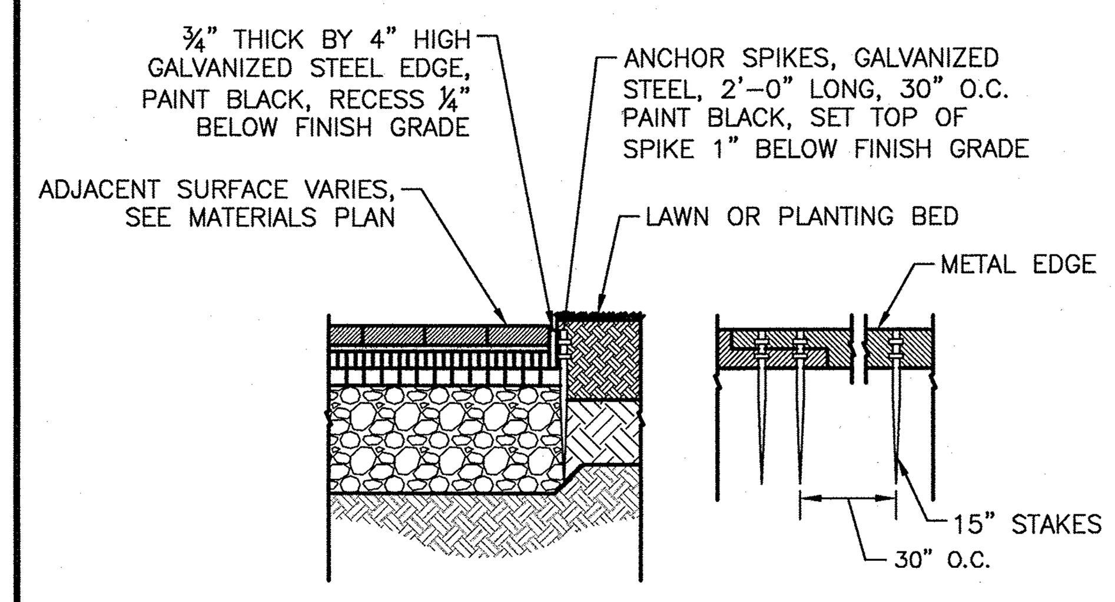
MWH
285 SUMMER STREET, SUITE 200
BOSTON, MASSACHUSETTS 02210
TEL:(617)314-7100

COMMONWEALTH OF MASSACHUSETTS JOHN J. STRUZZIERY No. 30438 REGISTERED PROFESSIONAL ENGINEER 5/31/12

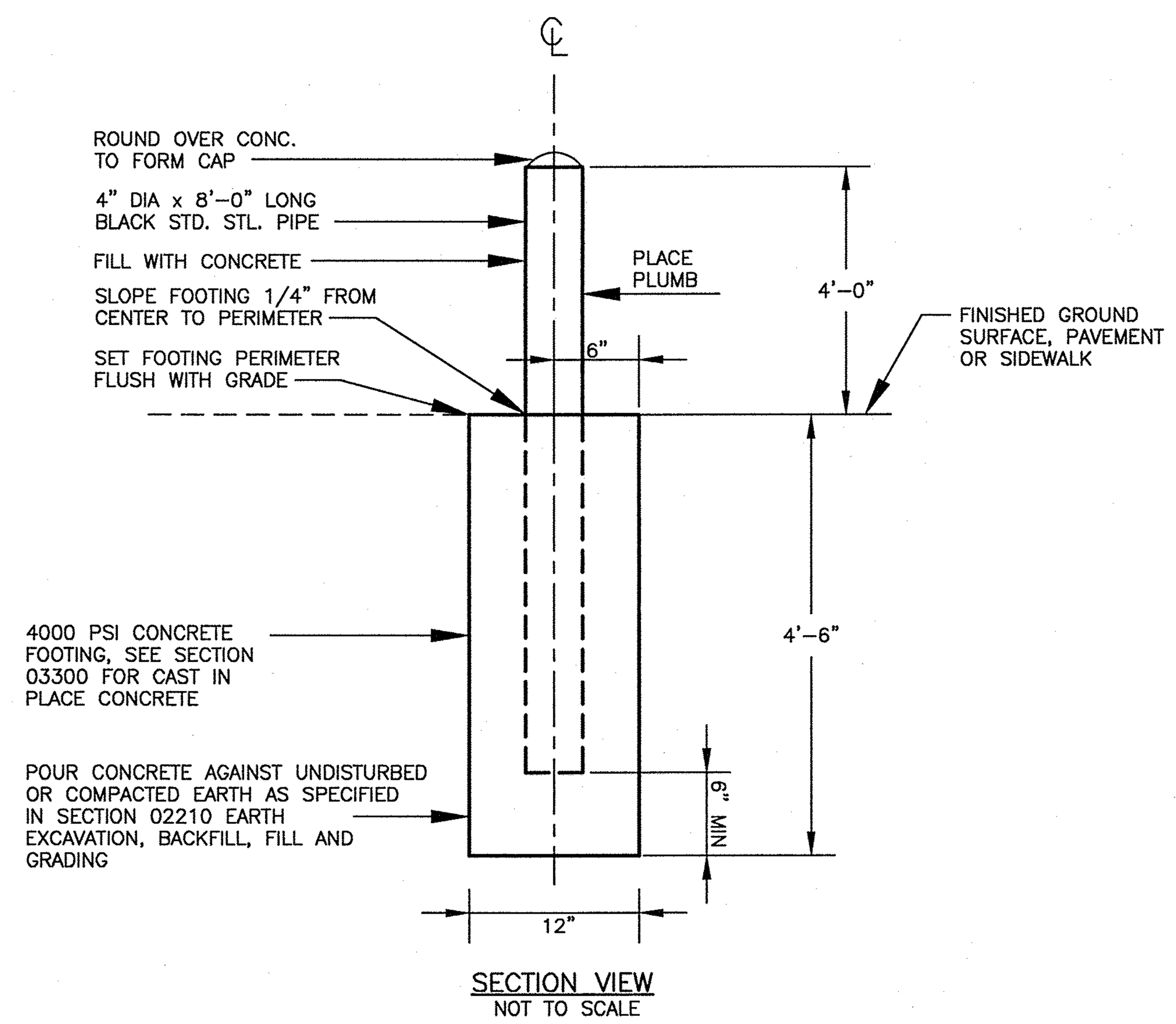
Scale	AS NOTED			
Date	SEPTEMBER 2012			
Job No.	2011010.01-A			
Designed by	TAL/JJL			
Drawn by	TAL/JJL			
Checked by	CMC/BJM	No.	Description	Date
Approved by	BJM	REVISIONS		

THE WORKS — CAMBRIDGE DEPARTMENT OF PUBLIC WORKS

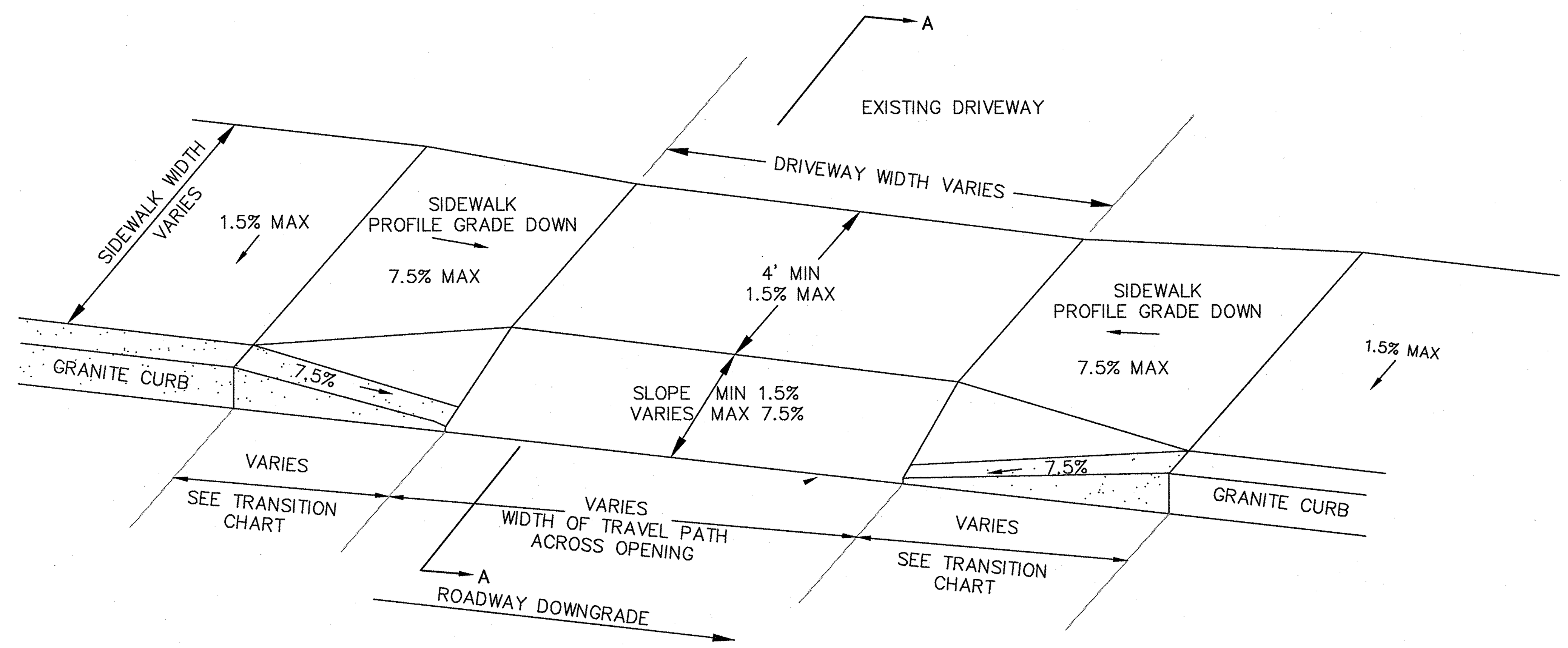
Client: CITY OF CAMBRIDGE, MASSACHUSETTS
Project: HURON A SEWER SEPARATION PROJECT
Contract No. 8A
Drawing: ROADWAY GENERAL
Roadway and Driveway Details
Sheet: RG-3
File No.



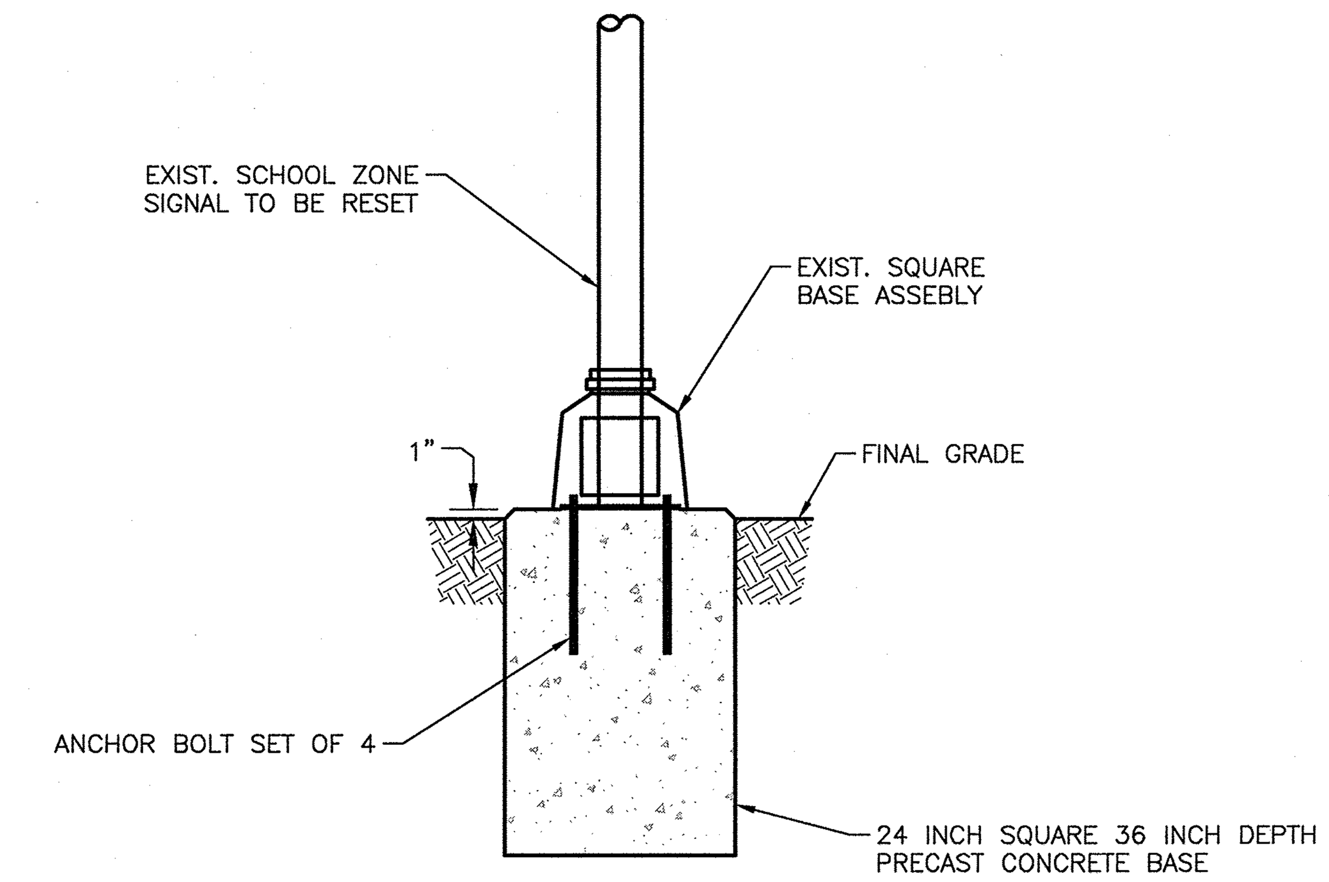
METAL EDGING WITH ANCHORS



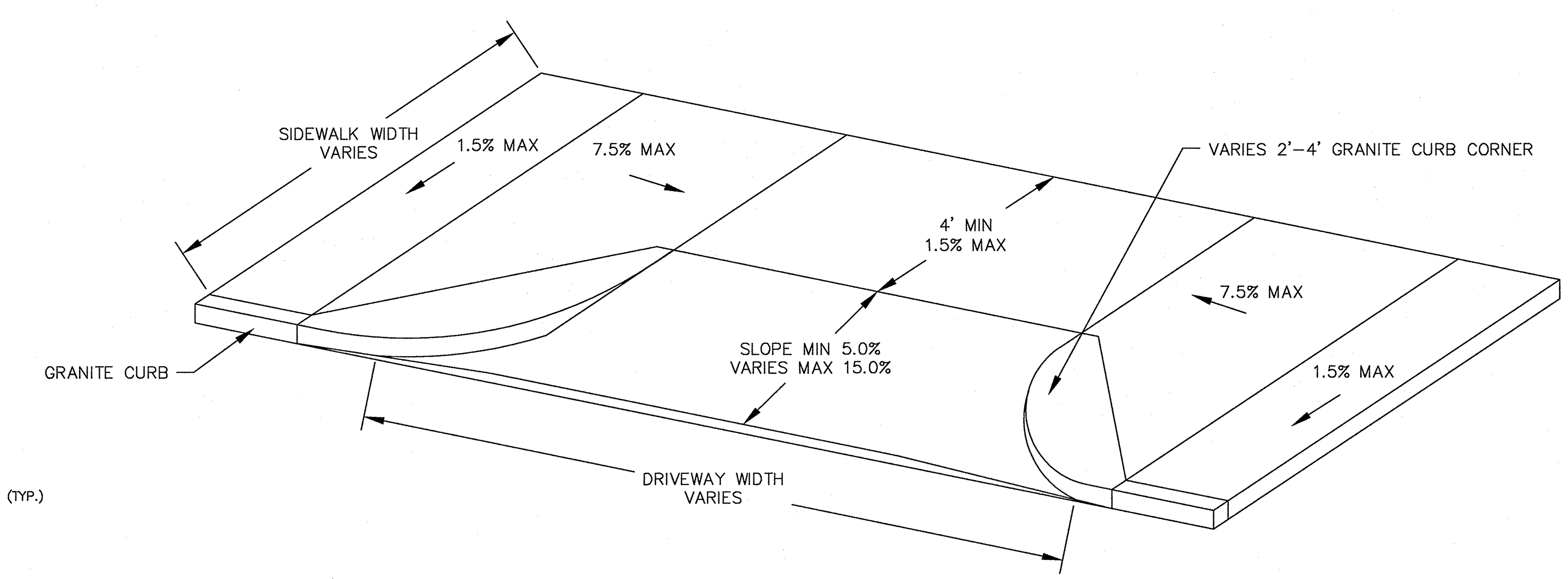
TYPICAL BOLLARD DETAIL
NOT TO SCALE



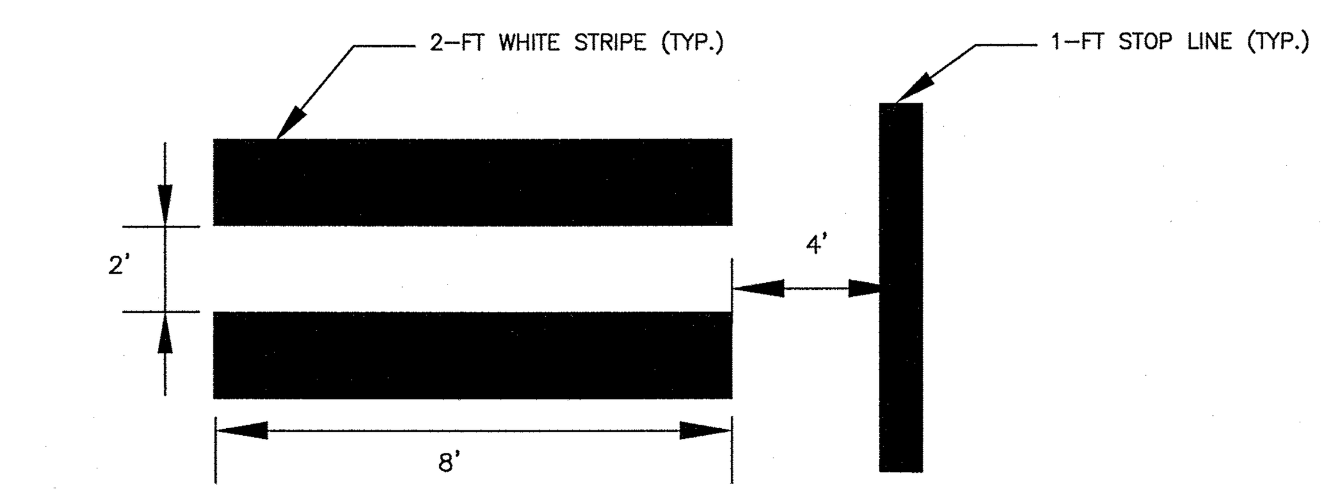
ADA DRIVEWAY DETAIL



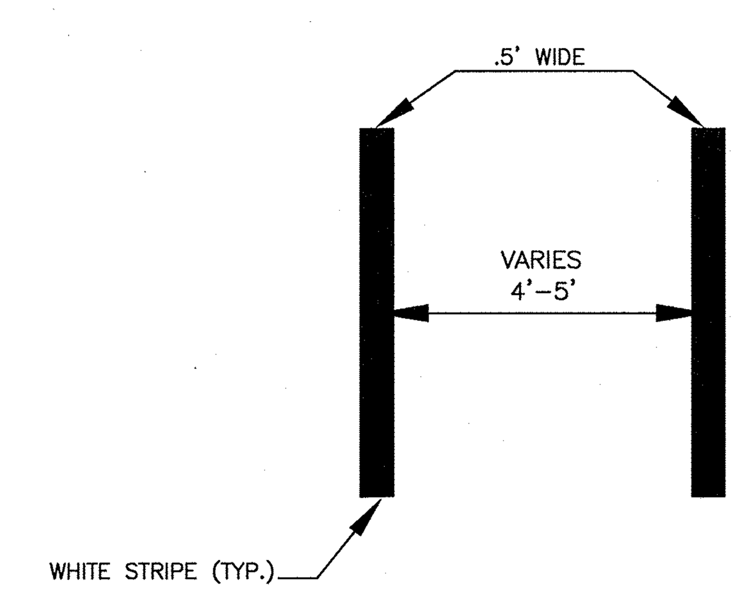
TYPICAL SCHOOL ZONE SIGNAL FOUNDATION DETAIL
NOT TO SCALE



DRIVEWAY DETAIL
WITH CURB CORNERS



CROSSWALK PAVEMENT MARKING DETAIL



BICYCLE LANE PAVEMENT MARKING DETAIL

CONFORMED SET

PLOT DATE=9/12/2012 3:04:23 PM USER=KYLE LANGLOIS FILENAME=G:_clients\Cambridge MA\2011010.01-A - Huron A\2.8 Drawings_Conformed\Civil Details (Conformed).dwg

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MANCHESTER, NEW HAMPSHIRE ROCKY HILL, CONNECTICUT
CAMBRIDGE, MASSACHUSETTS

MWH 285 SUMMER STREET, SUITE 200 BOSTON, MASSACHUSETTS 02210 TEL:(617)314-7100

COMMONWEALTH OF MASSACHUSETTS JOHN J. STRUZZIERY No. 30434 PROFESSIONAL ENGINEER 9/13/12

Scale	AS NOTED
Date	SEPTEMBER 2012
Job No.	2011010.01-A
Designed by	TAL/JL
Drawn by	TAL/JL
Checked by	CMC/BJM
Approved by	BJM

No.	Description	Date
REVISIONS		

THE WORKS CAMBRIDGE DEPARTMENT OF PUBLIC WORKS

Client: CITY OF CAMBRIDGE, MASSACHUSETTS
Project: HURON A SEWER SEPARATION PROJECT
Contract No. 8A
Drawing: ROADWAY GENERAL
Miscellaneous Details
Sheet: RG-4
File No.