

TOWN OF NEEDHAM, MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

90% SUBMISSION
FOR REVIEW
2/16/2016

DOWNTOWN IMPROVEMENTS PHASE I FEBRUARY 2016



BOARD OF SELECTMEN

MAURICE P. HANDEL, CHAIRMAN
MATTHEW BORRELLI, VICE CHAIRMAN
MARIANNE COOLEY, CLERK
DANIEL P. MATTHEWS
JOHN A. BULIAN

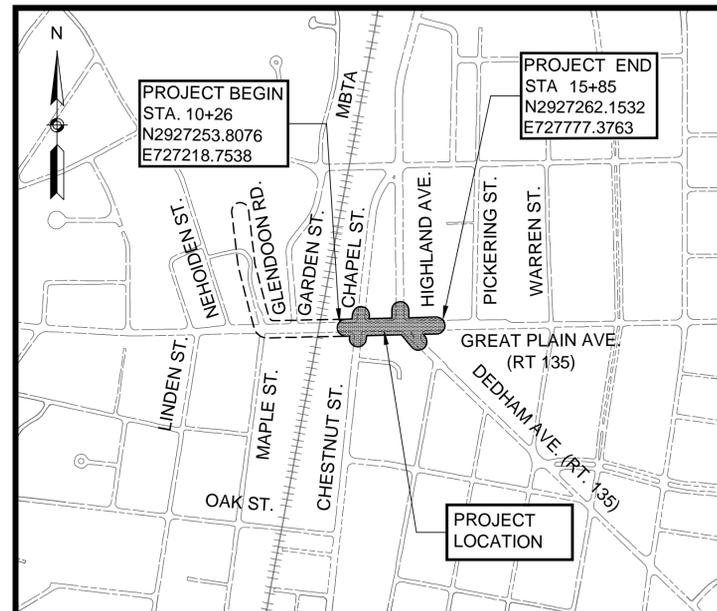
TOWN MANAGER

KATHLEEN P. FITZPATRICK

DEPARTMENT OF PUBLIC WORKS

RICHARD P. MERSON, DIRECTOR
ROBERT A. LEWIS, ASSISTANT DIRECTOR
ANTHONY L. DEL GAIZO, P.E., TOWN ENGINEER

CONTRACT NO. XXXX



LOCATION MAP
1"=500'
PROJECT LOCATION
DRAINAGE EXTENSION LOCATION

PLAN INDEX

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET & INDEX
2	LEGEND & ABBREVIATIONS
3	TYPICAL SECTIONS
4	GENERAL NOTES & PAVEMENT NOTES
5-8	CONSTRUCTION DETAILS
9	CONSTRUCTION PLAN
10	PROFILE
11-12	TIE PLANS
13	GRADING PLAN
14-16	DRAINAGE & UTILITY PLANS
17	SIGN & PAVEMENT MARKING PLAN
18	TRAFFIC SIGN SUMMARY
19-21	TRAFFIC SIGNAL PLANS
XX-XX	MAST ARM DETAILS
22	BICYCLE LOOP DETECTOR DETAILS
23	LOOP DETECTOR DETAILS
24-25	TEMPORARY TRAFFIC CONTROL PLANS
26-27	STREETSCAPE PLANS
28-34	STREETSCAPE DETAILS
35	PLANTING PLAN
36	PLANTING DETAILS
37	LIGHTING PLANS
38	LIGHTING DETAILS
39-42	CROSS SECTIONS

PREPARED BY:



IN ASSOCIATION WITH:



37 Fox Den Road
Kingston, MA 02364-2150
(508) 612-0382
www.PowerEngineersLLC.com
Electrical Engineering, Power, Lighting,
Technical Studies and Utility Consulting

LEGEND

GENERAL SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		CURB OR BERM (TYPE AS NOTED)
		EDGE OF PAVEMENT
		CATCH BASIN (OR GUTTER INLET, LEACHING BASIN, DROP INLET, CATCH BASIN CURB INLET)
		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 POLE TYPE 'A'
		STREET LIGHT POLE TYPE 'B'
		UTILITY POLE
		SIGN
		GUY POLE
		DRAIN PIPE (SIZE AS NOTED)
		SEWER MAIN (SIZE AS NOTED)
		ELECTRIC DUCT
		GAS MAIN (SIZE AS NOTED)
		WATER MAIN (SIZE AS NOTED)
		TELEPHONE DUCT (SIZE AS NOTED)
		MAIL BOX
		WOOD GUARD RAIL STEEL BEAM GUARD, WOOD OR STEEL POSTS (TYPE AS NOTED)
		STEEL GUARD RAIL, STEEL POSTS (TYPE NOTED)
		STONE WALL
		RETAINING WALL (TYPE NOTED)
		HIGHWAY/PROPERTY BOUND (TYPE AS NOTED)
		STATE HIGHWAY LAYOUT LINE (S.H.L.L.)
		CITY, TOWN OR COUNTY LAYOUT LINE (R.O.W.)
		CITY, TOWN, COUNTY OR STATE BOUNDARY LINE
		PROPERTY LINE
		EASEMENT LINE (TYPE NOTED)
		CONSTRUCTION BASELINE
		SURVEY LINE
		RAILROAD OR STREET RAILWAY TRACKS WITH SIDELINES
		WHEELCHAIR RAMP
		TREE (SIZE AND TYPE AS NOTED)
		HEDGE
		FENCE (SIZE AND TYPE AS NOTED)
		EDGE OF WETLAND W/ FLAGGED NUMBER
		EDGE OF RIVER/STREAM LINE
		100-FT. WETLAND BUFFER LIMIT
		100-FT. RIVER FRONT LIMIT
		200-FT. RIVER FRONT LIMIT
		WOODED AREA / LIMIT OF CLEARING
		SPOT GRADE
		SAW CUT LINE
		TEST PIT
		BRICK SIDEWALK OR CROSSWALK

ABBREVIATIONS

GENERAL

ABAN.	ABANDON	SW	SIDEWALK
ADJ.	ADJUST	SB	SOUTH BOUND OR STONE BOUND
AADT	ANNUAL AVERAGE DAILY TRAFFIC	S.H.L.	STATE HIGHWAY LAYOUT LINE
APPROX.	APPROXIMATE	STA.	STATION
℄	BASELINE	ST.	STOPPING SIGHT DISTANCE
BC	BOTTOM OF CURB	SSD	STREET
BM	BENCH MARK	TAN	TANGENT
BIT.	BITUMINOUS	T	TANGENT DISTANCE OF CURVE/TRUCK PERCENTAGE
B.B.	BITUMINOUS BERM	TC	TOP OF CURB
B.C.	BITUMINOUS CURB	TEB	TEMPORARY EASEMENT BOUNDARY
BOS	BOTTOM OF SLOPE	TEMP.	TEMPORARY
BOW	BOTTOM OF WALL	TOS	TOP OF SLOPE
BD OR BND	BOUND	TOW	TOP OF WALL
BLDG.	BUILDING	TP	TURNING POINT
CEM.	CEMENT	TYP.	TYPICAL
℄	CENTER LINE	VERT.	VARIABLE
CLF	CHAIN LINK FENCE	VAR.	VERTICAL
CONC.	CONCRETE	VC	VERTICAL CURVE
C.C.	CONCRETE CURB	VGC	VERTICAL GRANITE CURB
CONT.	CONTINUOUS	WB	WEST BOUND
CONST.	CONSTRUCTION	WCR	WHEELCHAIR RAMP
CO.	COUNTY	WD	WOOD
D	DELTA ANGLE (CENTRAL ANGLE OF HORIZ. CURVE)		
DHV	DESIGN HOURLY VOLUME	R	STEADY CIRCULAR RED
DWY.	DRIVEWAY	Y	STEADY CIRCULAR AMBER
EB	EAST BOUND	G	STEADY CIRCULAR GREEN
E.P., E.O.P.	EDGE OF PAVEMENT	FR	FLASHING CIRCULAR RED
EL.	ELEVATION	FY	FLASHING CIRCULAR AMBER
E.T.W.	EDGE OF TRAVEL WAY	↑	STEADY GREEN VERTICAL ARROW
EXIST.	EXISTING	→	STEADY RED RIGHT ARROW
FLDSTN	FIELDSTONE	↘	STEADY AMBER RIGHT ARROW
FDN.	FOUNDATION	↙	STEADY GREEN RIGHT ARROW
GAR.	GARAGE	←	STEADY RED LEFT ARROW
GRAN.	GRANITE	↖	STEADY AMBER LEFT ARROW
G.C.	GRANITE CURB	↗	STEADY GREEN LEFT ARROW
G.E.	GRANITE EDGING	W	STEADY WALK (PERSON WALKING) - LUNAR WHITE
GRAV.	GRAVEL	DW	STEADY DON'T WALK (HAND) - PORTLAND ORANGE
GD	GROUND	FDW	FLASHING DON'T WALK (FLASHING HAND) - PORTLAND ORANGE
HOR.	HORIZONTAL		
HMA	HOT MIX ASPHALT	ACCMP	ASPHALT COATED CORRUGATED METAL PIPE
HO	HOUSE	CB	CATCH BASIN
IP	IRON PIPE	CBCI	CATCH BASIN WITH CURB INLET
JCT	JUNCTION	CIP	CAST IRON PIPE
LT	LEFT	CIT	CHANGE IN TYPE
L	LENGHT OF CURVE	CL	CLASS (PIPE, CONCRETE, EXCAVATION, ETC.)
LP	LOW POINT	COND.	CONDUIT
MB	MAIL BOX	CAP	CORRUGATED ALUMINUM PIPE
MHB	MASSACHUSETTS HIGHWAY BOUND	CMP	CORRUGATED METAL PIPE
MAX.	MAXIMUM	CPP	CORRUGATED PLASTIC PIPE
MIN.	MINIMUM	CSP	CORRUGATED STEEL PIPE
NB	NORTH BOUND	CULV.	CULVERT
N.T.S.	NOT TO SCALE	CI	CURB INLET
O.C.	ON CENTER	DI	DROP INLET
PVMT.	PAVEMENT	DIP	DUCTILE IRON PIPE
PEB	PERMANENT EASEMENT BOUNDARY	EL. (OR ELEV.)	ELEVATION
P.S.B.	PLANTABLE SOIL BORROW	FM	FORCE MAIN
PCC	POINT OF COMPOUND CURVATURE	F&C	FRAME AND COVER
PC	POINT OF CURVATURE	F&G	FRAME AND GRATE
PRC	POINT OF REVERSE CURVATURE	GIP	GALVANIZED IRON PIPE
PI	POINT OF INTERSECTION	GG	GAS GATE
PT	POINT OF TANGENCY	GI	GUTTER INLET
PVC	POINT OF VERTICAL CURVATURE	HDW	HEADWALL
PVI	POINT OF VERTICAL INTERSECTION	HYD.	HYDRANT
PVT	POINT OF VERTICAL TANGENCY	INV.	INVERT ELEVATION
PGL	PROFILE GRADE LINE	L.P.	LIGHT POLE
PROJ.	PROJECT	MH	MANHOLE
℄ OR PROP. LINE	PROPERTY LINE	PVC	POLY-VINYL-CHLORIDE PIPE
PROP.	PROPOSED	PWW	PAVED WATER WAY
R	RADIUS OF CURVATURE	R&D	REMOVE & DISPOSE
RR	RAILROAD	RCP	REINFORCED CONCRETE PIPE (CLASS III UNLESS NOTED)
R&D	REMOVE & DISPOSE	SD	SEWER MANHOLE
REM.	REMOVE	TSV&B	TAPPING SLEEVE, VALVE AND BOX
REMOD.	REMODEL	TS	TRAFFIC SIGNAL
RET.	RETAIN	TSC	TRAFFIC SIGNAL CONDUIT
R&R	REMOVE AND RESET	UP	UTILITY POLE
R&S	REMOVE AND STACK	VCP	VITRIFIED CLAY PIPE
RT	RIGHT	WG	WATER GATE
ROW OR R/W	RIGHT-OF-WAY	WM	WATER METER/WATER MAIN
RD.	ROAD	WIP	WROUGHT IRON PIPE
SHT.	SHEET		
SHLD.	SHOULDER		

TRAFFIC SIGNAL SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		CONTROL CABINET GROUND MOUNTED WITH FOUNDATION
		CONTROL CABINET POLE MOUNTED
		CONTROLLER PHASE
		MAST ARM, SHAFT & BASE (ARM LENGTH AS NOTED)
		VEHICULAR SIGNAL HEAD (ALPHA-NUMERIC DESIGNATION AS NOTED)
		VEHICULAR SIGNAL HEAD, OPTICALLY PROGRAMMED
		VEHICULAR SIGNAL HEAD (REMOVED & RESET)
		FLASHING BEACON
		PEDESTRIAN SIGNAL HEAD
		PEDESTRIAN SIGNAL HEAD, OPTICALLY PROGRAMMED
		PULL BOX 12"x12" OR HANDHOLE
		LOOP DETECTOR
		PEDESTRIAN PUSH BUTTON
		PRE-EMPTION DETECTOR
		PRE-EMPTION CONFIRMATION STROBE
		SIGNAL CONDUIT (SINGLE RUN)
		SIGNAL CONDUIT (DOUBLE RUN)
		SIGNAL POST & BASE
		MAGNETIC DETECTOR
		SCHOOL ZONE SPEED LIMIT SIGN
		MICROWAVE OR ULTRASONIC DETECTOR
		VIDEO DETECTION CAMERA
		VIDEO DETECTION ZONE

TRAFFIC SIGNAL SYSTEMS

	STEADY CIRCULAR RED
	STEADY CIRCULAR AMBER
	STEADY CIRCULAR GREEN
	FLASHING CIRCULAR RED
	FLASHING CIRCULAR AMBER
	STEADY GREEN VERTICAL ARROW
	STEADY RED RIGHT ARROW
	STEADY AMBER RIGHT ARROW
	STEADY GREEN RIGHT ARROW
	STEADY RED LEFT ARROW
	STEADY AMBER LEFT ARROW
	STEADY GREEN LEFT ARROW
	STEADY WALK (PERSON WALKING) - LUNAR WHITE
	STEADY DON'T WALK (HAND) - PORTLAND ORANGE
	FLASHING DON'T WALK (FLASHING HAND) - PORTLAND ORANGE

UTILITIES

	ASPHALT COATED CORRUGATED METAL PIPE
	CATCH BASIN
	CATCH BASIN WITH CURB INLET
	CAST IRON PIPE
	CHANGE IN TYPE
	CLASS (PIPE, CONCRETE, EXCAVATION, ETC.)
	CONDUIT
	CORRUGATED ALUMINUM PIPE
	CORRUGATED METAL PIPE
	CORRUGATED PLASTIC PIPE
	CORRUGATED STEEL PIPE
	CULVERT
	CURB INLET
	DROP INLET
	DUCTILE IRON PIPE
	ELEVATION
	FORCE MAIN
	FRAME AND COVER
	FRAME AND GRATE
	GALVANIZED IRON PIPE
	GAS GATE
	GUTTER INLET
	HEADWALL
	HYDRANT
	INVERT ELEVATION
	LIGHT POLE
	MANHOLE
	POLY-VINYL-CHLORIDE PIPE
	PAVED WATER WAY
	REMOVE & DISPOSE
	REINFORCED CONCRETE PIPE (CLASS III UNLESS NOTED)
	SEWER MANHOLE
	SUBDRAIN
	TAPPING SLEEVE, VALVE AND BOX
	TRAFFIC SIGNAL
	TRAFFIC SIGNAL CONDUIT
	UTILITY POLE
	VITRIFIED CLAY PIPE
	WATER GATE
	WATER METER/WATER MAIN
	WROUGHT IRON PIPE

PAVEMENT MARKINGS AND SIGNING SYMBOLS

PROPOSED

	CW	CROSSWALK, 2 - 12" WHITE LINES (8' WIDTH)
	SL	STOP LINE - 12" WHITE LINE 4' BEHIND CW (TYP.)
	SWEL	SOLID WHITE EDGE LINE - 4"
	SWCHEV	SOLID WHITE CHEVRON LINES 12", (SPACING NOTED)
	SWGGL	SOLID WHITE GORE LINE 12" @ 45", (SPACING NOTED)
	SWLL	SOLID WHITE LANE LINE - 4"
	SWPL	SOLID WHITE PARKING LINE - 4"
	BWLL	BROKEN WHITE LANE LINE - 4"
	BWGL	BROKEN WHITE GUIDE LINE - 4" (2' LINE & 4' GAP)
	BYCL	BROKEN YELLOW CENTERLINE - 4"
	BYLL	BROKEN YELLOW LANE LINE - 4"
	DYCL	DOUBLE YELLOW CENTERLINE - 2 - 4" LINES
	DWLEx	DOTTED WHITE LANE EXTENSION LINE - 4" (2' LINE & 6' GAP)
	SYEL	SOLID YELLOW GORE LINE 12" @ 45", (SPACING NOTED)
	SYGL	SOLID YELLOW LANE LINE - 4"
	SCHOOL	SCHOOL ZONE - WHITE
	♿	HANDICAP SYMBOL - WHITE
	→	PAVEMENT ARROW - WHITE
	ONLY	LEGEND "ONLY" - WHITE

C:\5100a\5126 - Needham - Downtown Streetscape Phase 1\Drawing Files\Plan Set\5126 LEGEND.dwg

NUMBER	DATE	MADE BY	CHECKED BY	DESCRIPTION
REVISIONS				

DRAWN BY:	CK
DESIGNED BY:	TJ
CHECKED BY:	DJ

PE STAMP:	
-----------	--

PREPARED BY:

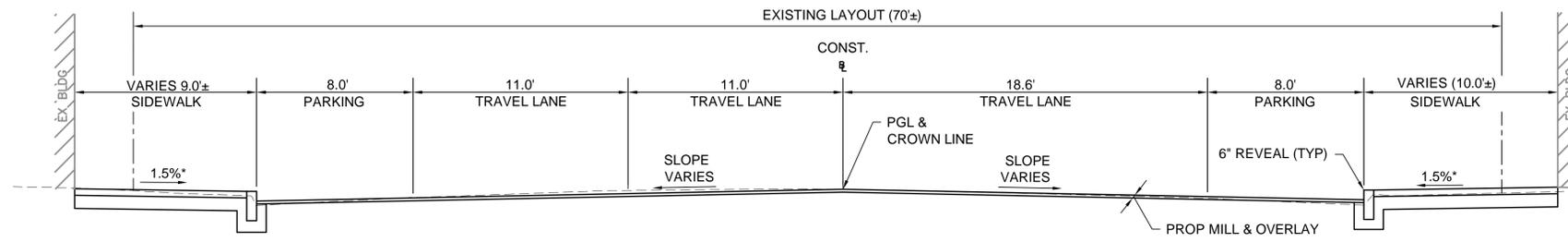
www.BETA-Inc.com

SCALE:	
--------	--

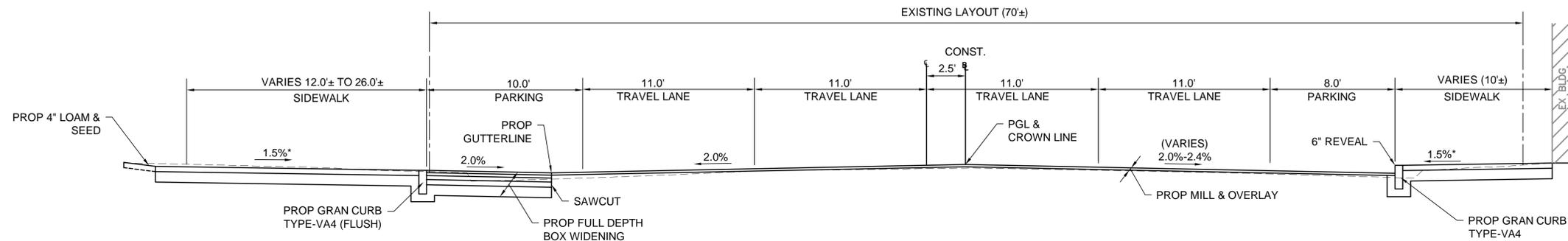
UNLESS OTHERWISE NOTED OR CHANGED BY REPRODUCTION

**TOWN CENTER
PHASE-I IMPROVEMENTS
LEGEND & ABBREVIATIONS
NEEDHAM, MASSACHUSETTS**

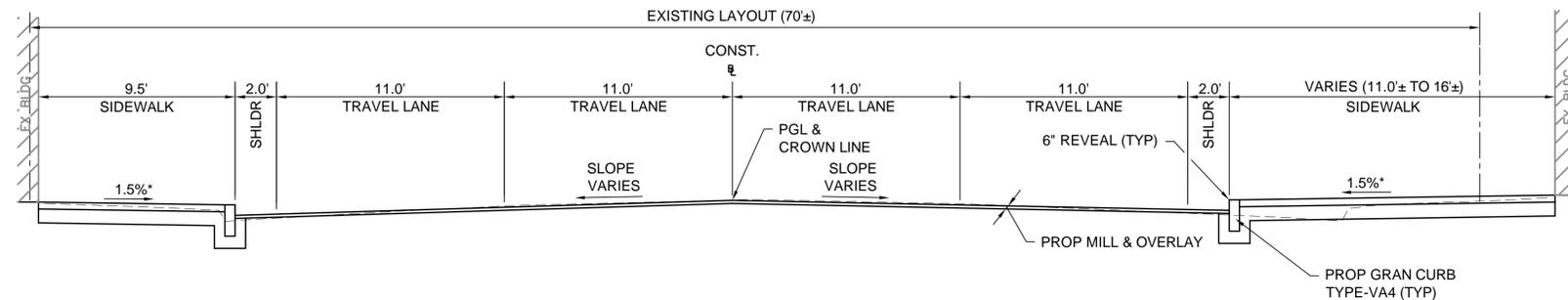
BETA JOB No.	5126
PLOT DATE:	2/11/2016 4:28 PM
ISSUE DATE	12/10/2015
SHEET No.	2 OF 42
File:	5126 LEGEND.dwg



GREAT PLAIN AVENUE
NOT TO SCALE
STA 14+80± TO 15+85±



GREAT PLAIN AVENUE
NOT TO SCALE
STA 12+30± TO 13+40±



GREAT PLAIN AVENUE
NOT TO SCALE
STA 10+65± TO 11+20±

* TOLERANCE FOR CONSTRUCTION ±0.5%

SEE CONSTRUCTION PLAN FOR LIMIT OF FULL DEPTH CONSTRUCTION & MILL AND OVERLAY

NOTE:
FOR SPECIFIC TREATMENT BEYOND THE BACK OF THE PROPOSED SIDEWALK OR EDGING, SEE THE CONSTRUCTION PLANS AND CROSS SECTIONS. APPROXIMATE TOP AND BOTTOM OF SLOPE LINE IS SHOWN ON THE CONSTRUCTION PLANS.

C:\5100a\5126 - Needham - Downtown Streetscape Phase 1\Drawing Files\Plan Set\5126 TYP SEC.dwg

NUMBER	DATE	MADE BY	CHECKED BY	DESCRIPTION

DRAWN BY:	CK
DESIGNED BY:	KY
CHECKED BY:	DJ

PE STAMP:

PREPARED BY:



www.BETA-inc.com

SCALE:

UNLESS OTHERWISE NOTED OR CHANGED BY REPRODUCTION

**TOWN CENTER
PHASE-I IMPROVEMENTS
TYPICAL SECTIONS
NEEDHAM, MASSACHUSETTS**

BETA JOB No.	5126
PLOT DATE:	2/11/2016 4:28 PM
ISSUE DATE:	12/10/2015
SHEET No.	3 OF 42
File:	5126 TYP SEC.dwg

GENERAL NOTES

- THE LOCATION OF SUBSURFACE UTILITIES SHOWN IS APPROXIMATE AND NOT GUARANTEED TO BE COMPLETE OR ACCURATE. THE CONTRACTOR SHALL VERIFY THE LOCATIONS AND ELEVATIONS OF EXISTING UTILITY LINES AND STRUCTURES PRIOR TO COMMENCEMENT OF WORK. THE CONTRACTOR MUST NOTIFY DIG SAFE PRIOR TO ANY EXCAVATION, DEMOLITION OR EXPLOSION WORK IN PUBLIC OR PRIVATE WAYS OR UTILITY COMPANY RIGHT-OF-WAY OR EASEMENT.
- 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 THE RESOLUTION OF THE CONFLICT.
- THE CONTRACTOR SHALL ALTER THE MASONRY OF THE TOP SECTION OF ALL EXISTING DRAINAGE AND SANITARY STRUCTURES AS NECESSARY FOR THE CHANGES IN GRADE, AND RESET ALL WATER AND DRAINAGE FRAMES, GRATES AND BOXES TO THE PROPOSED FINISH SURFACE GRADE. REQUIRED NEW MASONRY SHALL BE CLAY BRICK CONFORMING TO M4.05.2.
- THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE, CABLE TV, FIRE ALARM AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES. ALL UTILITY CASTING AND FIRE ALARM BOXES SHALL BE ADJUSTED TO FINISH GRADE BY THEIR RESPECTIVE OWNERS.
- AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE.
- THE TERM "PROPOSED" (PROP.) MEANS WORK TO BE CONSTRUCTED USING NEW MATERIALS OR, WHERE APPLICABLE, RE-USING EXISTING MATERIALS IDENTIFIED AS "REMOVE AND RESET" (R&R).
- JOINTS BETWEEN NEW HOT MIX ASPHALT ROADWAY PAVEMENT AND SAWCUT EXISTING PAVEMENT SHALL BE SEALED WITH BITUMEN AND BACKSANDED.
- ALL DRAINAGE STRUCTURES SHALL BE RETAINED UNLESS NOTED OTHERWISE.
- ALL FRAMES AND GRATES FOR PROPOSED DRAINAGE STRUCTURES SHALL BE MUNICIPAL STANDARD.
- CATCH BASIN AND MANHOLE FRAMES AND GRATES/COVERS SHALL CLEARLY ALIGN WITH THE OPENINGS IN THE PRECAST STRUCTURES AND THE GRADE OF THE ROADWAY.
- UNLESS OTHERWISE NOTED EXISTING DRAINAGE LINES TO BE REPLACED SHALL BE ABANDONED IN PLACE. IF THEY CONFLICT WITH THE PROPOSED DRAINAGE LINES THEY SHALL BE REMOVED AS DIRECTED BY THE ENGINEER.
- WHERE DRAINAGE PIPES OR STRUCTURES ARE ABANDONED IN PLACE THE CONTRACTOR SHALL MAKE SURE THAT ALL CONNECTING PIPES, INLETS AND OUTLETS ARE PLUGGED. ALL LIVE CONNECTIONS SHALL BE CONNECTED TO THE NEW SYSTEM.
- ALL CURB TIE DIMENSIONS ARE TO THE FACE OF THE CURB (GUTTER LINE) OR EDGE OF TRAVEL WAY.
- ALL PROPOSED GRANITE CURB SHALL BE TYPE VA-4 UNLESS OTHERWISE NOTED ON THE PLAN.
- PROPOSED SIDEWALKS AND WHEELCHAIR RAMPS SHALL BE CONSTRUCTED TO THE NEAREST SCORE LINE OR EXPANSION JOINT IN THE EXISTING ADJACENT WALK SURFACE AS DIRECTED BY THE ENGINEER.
- ALL DRIVEWAY LIMITS ARE AS SHOWN ON THE PLANS SHALL BE VERIFIED IN THE FIELD AND MAY BE ADJUSTED IF NECESSARY BY THE ENGINEER.
- PROPOSED SIDEWALK AT SIGNS, POLES AND OTHER FEATURES SHALL BE BOXED AND PROVIDED FLEXIBLE JOINT FILLER.
- THE PROPOSED SIDEWALK GRADE SHALL MEET THE EXISTING GRADE AT ALL STORE/BUSINESS DOOR ENTRANCE ELEVATIONS UNLESS OTHERWISE NOTED ON THE PLAN.
- ORNAMENTAL STREET LIGHTING LAYOUTS ARE SHOWN ON LIGHTING PLANS. THE DETAILS ARE SHOWN ON LIGHTING DETAIL SHEETS.
- PROPOSED TREE PLANTING, LANDSCAPE ISLAND AND OTHER AMENITIES ARE SHOWN ON LANDSCAPE PLANS AND DETAIL SHEETS.
- WHEN WORKING NEXT TO EXISTING WALLS, BERMS, AND OTHER STRUCTURES, CONTRACTOR SHALL EXERCISE EXTREME CAUTION NOT TO DISTURB THE EXISTING STRUCTURES. ANY DAMAGE TO THE EXISTING STRUCTURES SHALL BE REPAIRED BY THE CONTRACTOR AT HIS OWN EXPENSE.
- DUE TO THE PROJECT IN DOWNTOWN AREA, CONTRACTOR SHALL EXERCISE EXTREME CAUTION NOT TO DISTURB EXISTING STORE ENTRANCES, DOOR SILLS, VENTS, BUILDING STEPS OR FACES, WHEN CONSTRUCTING PROPOSED SIDEWALK. THE CONTRACTOR SHALL MEET ALL EXISTING GRADES AT THESE LOCATIONS UNLESS OTHERWISE SHOWN ON THE PLAN.
- SAFETY CONTROLS FOR CONSTRUCTION OPERATIONS SHALL BE IN ACCORDANCE WITH MASSDOT REQUIREMENTS AND THE LATEST VERSION OF THE MUTCD.
- SURVEY BASE PLAN BY CHAPEL ENGINEERING ASSOCIATES, LLC ON SEPTEMBER, 2013.
- THE SURVEY BASE PLAN ARE IN U.S. SURVEY FEET IN THE MASSACHUSETTS STATE PLANE COORDINATE SYSTEM REFERENCED TO THE NORTH AMERICAN DATUM OF 1983.
- ELEVATIONS, IN U.S. SURVEY FEET, ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
- REMOVAL OF ALL EXISTING TREES, SHRUBS, PLANTINGS AND BOULDERS AS NOTED ON THE PLAN SHALL BE PAID UNDER ITEM 101 SITE PREPARATION.
- PROPOSED TREE LOCATIONS ARE APPROXIMATE. THE CONTRACTOR SHALL STAKE TREES IN THE FIELD PRIOR TO INSTALLATION FOR APPROVAL BY THE ENGINEER.
- LOCATION OF PROPOSED SHRUB PLANTINGS ARE APPROXIMATE. THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER PRIOR TO INSTALLATION.
- THE SOIL MIX SHALL BE APPLIED AT THE LOCATIONS SHOWN ON THE LANDSCAPE PLANS. THE SOIL MIX SHALL BE USED IN LIEU OF GRAVEL BORROW UNDER SIDEWALK.

PAVEMENT NOTES

PAVEMENT MILLING AND OVERLAY

SURFACE COURSE: 2" CLASS I BITUMINOUS CONCRETE TOP COURSE - TYPE I-1 OVER

INTERMEDIATE COURSE: 2" CLASS I BITUMINOUS CONCRETE BINDER COURSE - TYPE I-1 OVER

PAVEMENT MILLING: 2-4" PAVEMENT MILLING

NOTE: 1.5" MAX SUPERPAVE LEVELING COURSE 9.5 (SLC-9.5) IN AREAS NOT ABLE TO BE SHAPED WITH MILLING.

FULL DEPTH PAVEMENT BOX WIDENING

SURFACE COURSE: 2" CLASS I BITUMINOUS CONCRETE TOP COURSE - TYPE I-1 OVER

INTERMEDIATE COURSE: 2" CLASS I BITUMINOUS CONCRETE BINDER COURSE - TYPE I-1 OVER

BASE COURSE: 4" CLASS I BITUMINOUS CONCRETE BASE COURSE - TYPE I-1 OVER

SUB-BASE: 4" DENSE GRADED CRUSHED STONE OVER 8" GRAVEL BORROW, TYPE b

FULL DEPTH PAVEMENT BOX WIDENING ≤4' WIDE

SURFACE COURSE: 2" CLASS I BITUMINOUS CONCRETE TOP COURSE - TYPE I-1 OVER

INTERMEDIATE COURSE: 2" CLASS I BITUMINOUS CONCRETE BINDER COURSE - TYPE I-1 OVER

BASE COURSE: 6" HES CEMENT CONCRETE BASE COURSE OVER

SUB-BASE: 8" GRAVEL BORROW, TYPE b

TACK COAT: ASPHALT EMULSION FOR TACK COAT, GRADE RS-1 SHALL BE PLACED AT A RATE OF:
0.07 GALLONS PER SQUARE YARD OVER MILLED SURFACES
0.07 GALLONS PER SQUARE YARD OVER CEMENT CONCRETE BASE COURSE
0.05 GALLONS PER SQUARE YARD OVER SMOOTH TIGHT PAVEMENTS PRIOR TO PAVING AN OVERLAY

EXPOSED AGGREGATE CONCRETE SIDEWALK AND WHEELCHAIR RAMPS

SURFACE COURSE: 4" CEMENT CONCRETE

SUB BASE: 8" GRAVEL BORROW TYPE C (MIN.) OR COMBINATION OF EXISTING SUITABLE SUB BASE AS APPROVED BY THE ENGINEER.

WHEELCHAIR RAMP NOTES

- ALL WHEELCHAIR RAMPS SHALL CONFORM TO THE REQUIREMENTS OF THE ARCHITECTURAL ACCESS BOARD (A.A.B.) AND THE AMERICANS WITH DISABILITIES ACT (A.D.A.). AND THE TOWN OF NEEDHAM STANDARDS.
- THE LOCATION OF PROPOSED WHEELCHAIR RAMPS ARE SHOWN ON CONSTRUCTION PLANS AND THE WHEELCHAIR RAMP DETAILS. EXACT LOCATIONS MAY BE ADJUSTED, IF NECESSARY, BY THE ENGINEER IN THE FIELD.
- ALL PROPOSED WHEELCHAIR RAMPS SHALL HAVE DETECTABLE WARNING PANELS INSTALLED IN ACCORDANCE WITH MASSDOT CONSTRUCTION STANDARD DRAWINGS. THE PANEL SHALL BE VARIES TO MEET OPENING OF THE RAMP AS SHOWN. THE COLOR OF THE PANEL SHALL BE APPROVED BY THE ENGINEER.
- IN INSTANCES WHERE AN EXISTING MANHOLE, HANDHOLE OR OTHER "SURFACE" TYPE STRUCTURE THAT CANNOT BE REMOVED OR RESET, IS WITHIN THE ACTUAL WHEELCHAIR RAMP PATH, THE STRUCTURE SHALL BE CAREFULLY ADJUSTED SUCH THAT THE TOPMOST SURFACES OF THE STRUCTURE COVER SHALL BE FLUSH WITH THE RAMP SURFACE AND SHALL MATCH THE SLOPE OF THE NEW WHEELCHAIR RAMP AS DIRECTED BY THE ENGINEER.
- ALL WHEELCHAIR RAMPS ARE DESIGNED INDIVIDUALLY TO MEET EACH LOCATION'S CRITERIA. THE SPECIAL DESIGN IS CALLED BLENDED TRANSITION RAMP. THE RUNNING SLOPE OF THE RAMP SHALL BE 5% MAXIMUM AND CROSS SLOPE SHALL BE 2% MAXIMUM AS SHOWN ON THE CONSTRUCTION DETAIL. THE CONTRACTOR SHALL GET APPROVAL OF WHEELCHAIR RAMP LAYOUT BEFORE POURING OF CONCRETE AND ADJUST, IF NECESSARY, AT THE DIRECTION OF THE ENGINEER.

O:\5100a\5126 - Needham - Downtown Streetscape Phase 1\Drawing Files\Plan Set\5126 DETAILS.dwg

NUMBER	DATE	MADE BY	CHECKED BY	DESCRIPTION

DRAWN BY: CK	PE STAMP:
DESIGNED BY: TJ	
CHECKED BY: DJ	



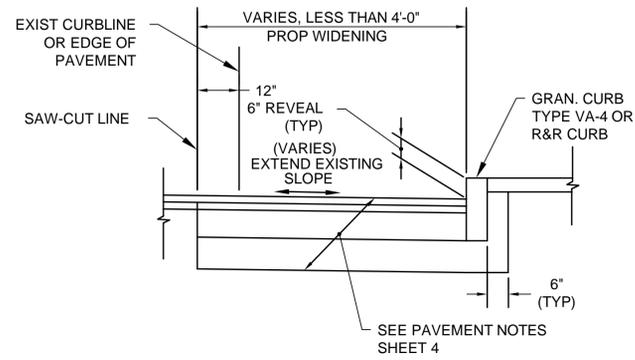
PREPARED BY:

SCALE:

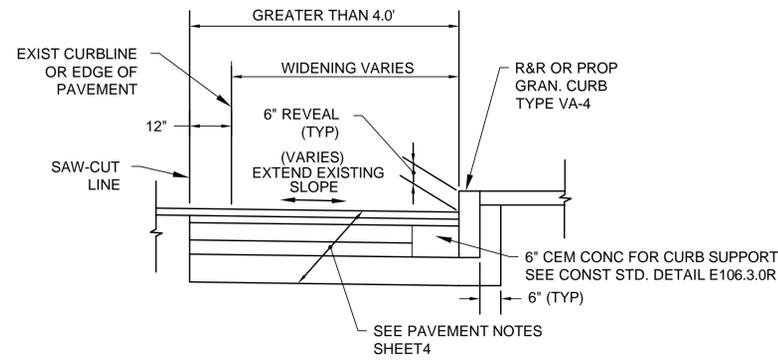
UNLESS OTHERWISE NOTED OR CHANGED BY REPRODUCTION

**TOWN CENTER
PHASE-I IMPROVEMENTS
GENERAL NOTES & PAVEMENT NOTES
NEEDHAM, MASSACHUSETTS**

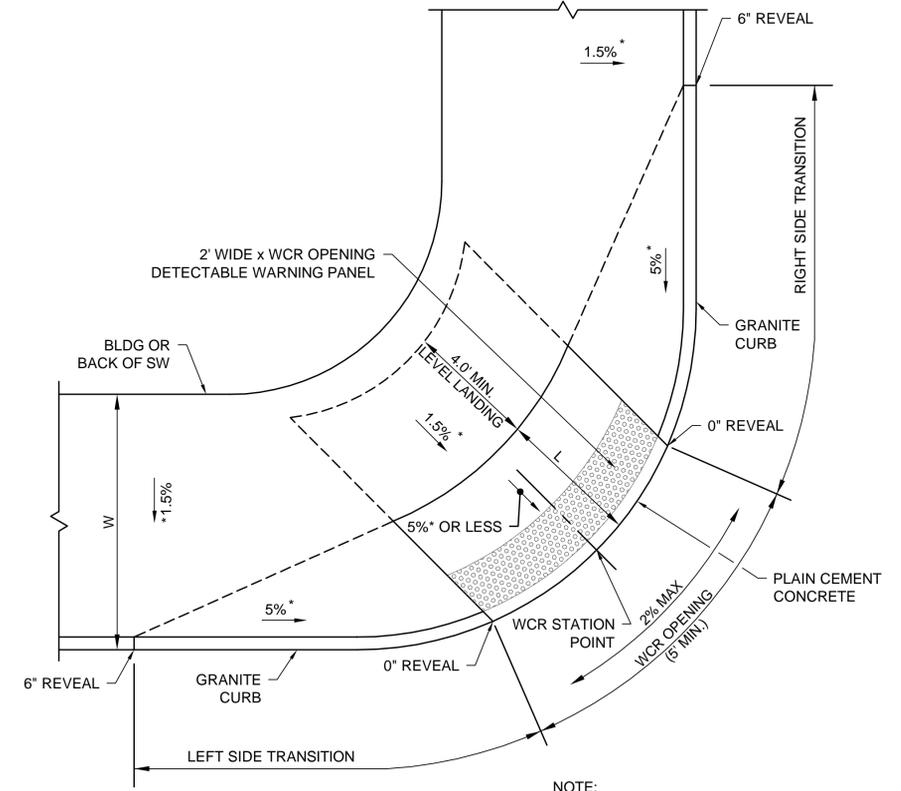
BETA JOB No.	5126
PLOT DATE:	2/11/2016 4:29 PM
ISSUE DATE	12/10/2015
SHEET No.	4 OF 42
File:	5126 DETAILS.dwg



DETAIL FOR BOX WIDENING LESS THAN 4.0'
NOT TO SCALE

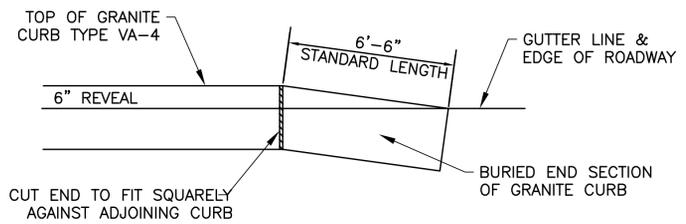


DETAIL FOR BOX WIDENING GREATER THAN 4.0'
NOT TO SCALE

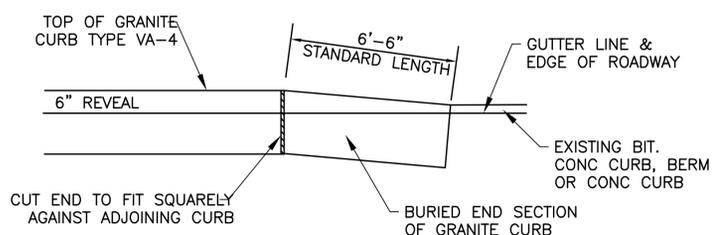


WHEELCHAIR RAMP DETAIL TYPE "A"
NOT TO SCALE

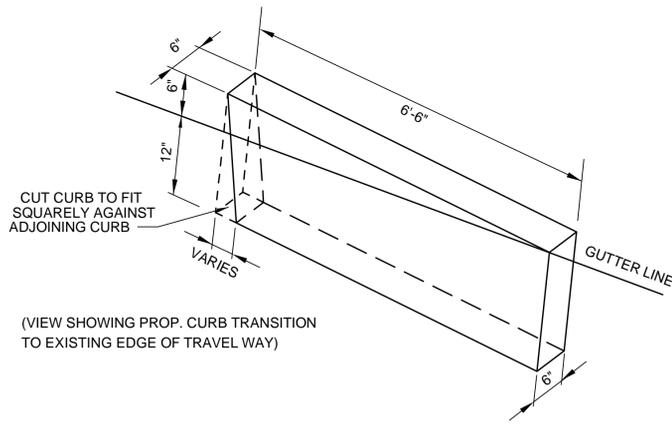
NOTE:
ROADWAY, GUTTER, AND FIRST 6" OF SIDEWALK
TO BE ADJUSTED FOR FIELD CONDITIONS.



**DETAIL FOR TRANSITION CURB
PROP CURB TO EXISTING EDGE OF TRAVEL WAY**
NOT TO SCALE



**DETAIL FOR TRANSITION CURB
TRANSITION CURB - PROP CURB TO EXISTING CURB**
NOT TO SCALE



GRANITE TRANSITION CURB
NOT TO SCALE

(VIEW SHOWING PROP. CURB TRANSITION
TO EXISTING EDGE OF TRAVEL WAY)

WHEELCHAIR RAMP DATA TYPE "A"									
WCR #	RAMP REFERENCE POINT		LENGTH OF	WIDTH OF	WIDTH OF	WIDTH OF	ROADWAY	TRANSITION LENGTH**	
	STATION	OFFSET	PRIMARY RAMP (L)	SIDEWALK (W)	RAMP ENTRANCE 5.0' (MIN.)	LEVEL LANDING 4.0' (MIN.)	GUTTER SLOPE	LT. SIDE	RT. SIDE
1	11+20.4 GREAT PLAIN AVE.	33.7' RT	5.5'	10.7'-15.6'	6.0'	8.0'	-0.8%	10.0'	10.0'
2	11+38.3 GREAT PLAIN AVE.	29.0' LT	5.5'	7.9'-12.0'	10.0'	5.5'	1.8%	10.0'	10.0'
3	11+73.9 GREAT PLAIN AVE.	30.5' RT	5.5'	7.2'-14.2'	10.0'	6.7'	-0.8%	10.0'	10.0'
4	11+97.2 GREAT PLAIN AVE.	35.9' LT	5.5'	8.0'-25.0'	5.0'	17.0'	1.0%	10.0'	12.5'
5	13+69.9 GREAT PLAIN AVE.	41.9' LT	5.5'	8.0'-20.0'	5.0'	12.3'	-0.5%	11.0'	10.0'
6	13+96.1 GREAT PLAIN AVE.	26.4' RT	4.5'	7.4'-14.4'	10.0'	4.8'	1.0%	10.0'	10.0'
7	14+27.7 GREAT PLAIN AVE.	34.3' LT	5.5'	8.9'-18.3'	10.0'	8.0'	2.0%	10.0'	N/A
8	15+21.8 GREAT PLAIN AVE.	40.2' RT	5.0'	11.8'-11.9'	6.0'	7.0'	-0.9%	10.0'	10.0'

NOTE:
** BASED ON A DESIGN SLOPE OF 5.0% AND A REVEAL OF 6".

*TOLERANCE FOR CONSTRUCTION ±0.5%

O:\5100a\5126 - Needham - Streetscope Phase 1\Drawing Files\Plan Set\5126 DETAILS.dwg

NUMBER	DATE	MADE BY	CHECKED BY	DESCRIPTION

DRAWN BY: CK
DESIGNED BY: TJ
CHECKED BY: DJ

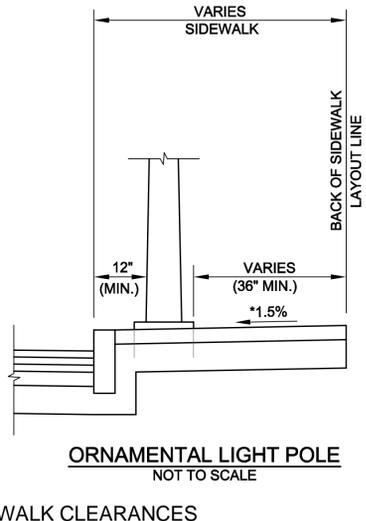
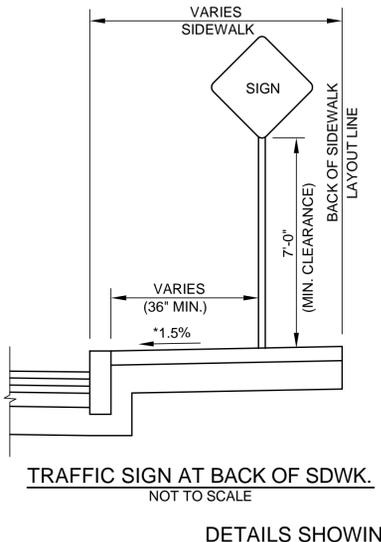
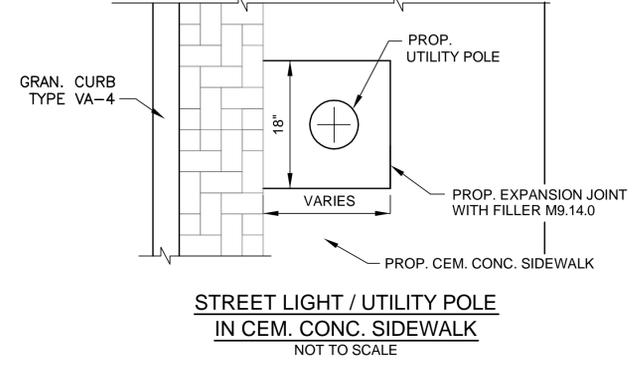
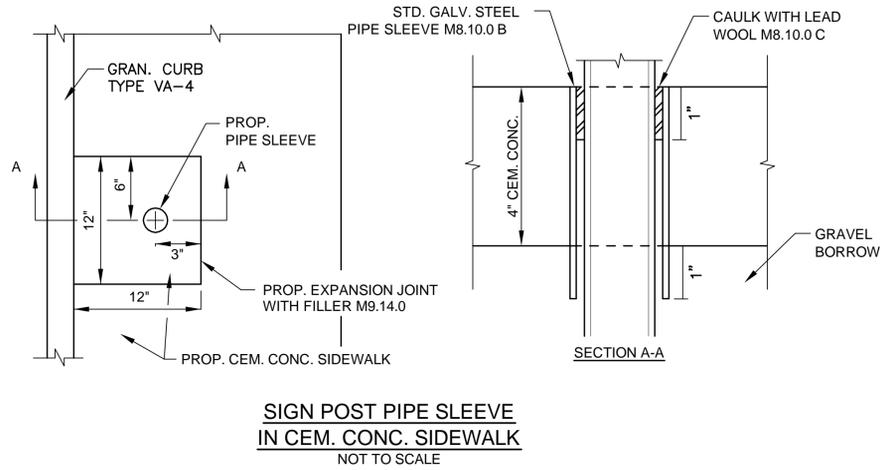
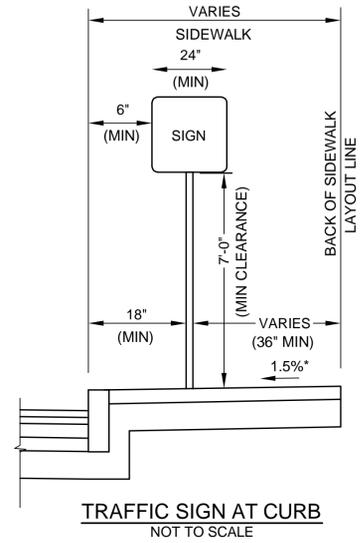
PE STAMP:
PREPARED BY:



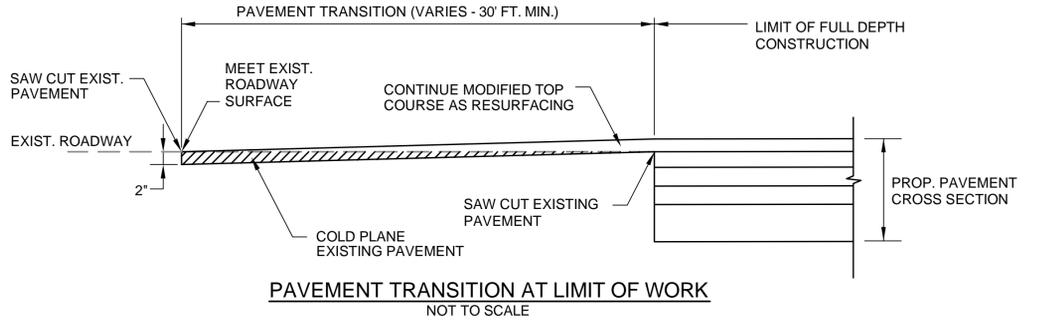
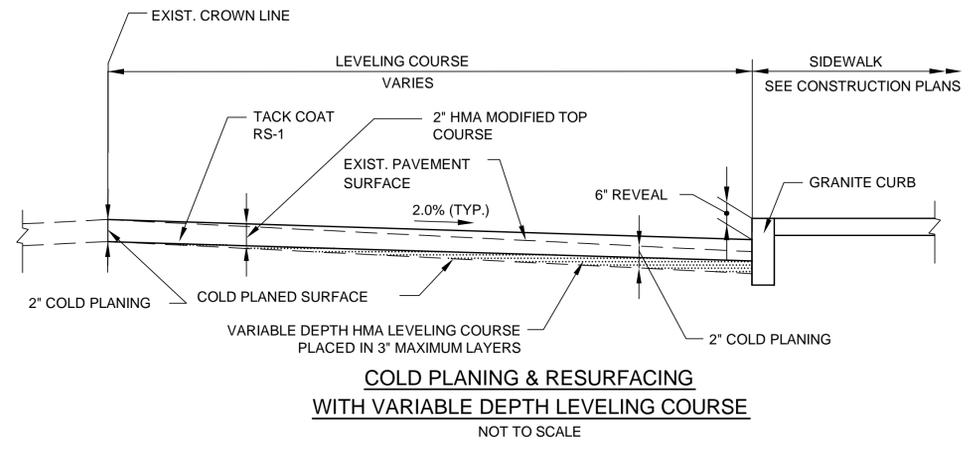
SCALE:
UNLESS OTHERWISE NOTED OR CHANGED BY REPRODUCTION

**TOWN CENTER
PHASE-I IMPROVEMENTS
CONSTRUCTION DETAILS
NEEDHAM, MASSACHUSETTS**

BETA JOB No. 5126
PLOT DATE: 2/11/2016 4:29 PM
ISSUE DATE: 12/10/2015
SHEET No. **6 OF 42**
File: 5126 DETAILS.dwg



DETAILS SHOWING SIDEWALK CLEARANCES



*TOLERANCE FOR CONSTRUCTION ±0.5%

O:\5100s\5126 - Needham - Streetscape Phase 1\Drawing Files\Plan Set\5126 DETAILS.dwg

NUMBER	DATE	MADE BY	CHECKED BY	DESCRIPTION

DRAWN BY: CK
DESIGNED BY: TJ
CHECKED BY: DJ

PE STAMP:

PREPARED BY:

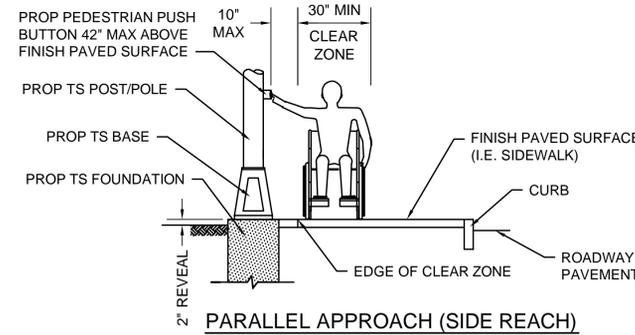
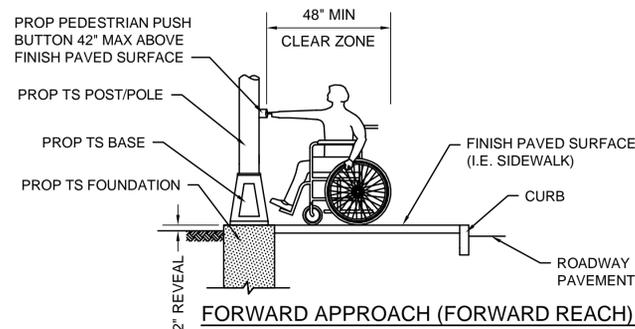
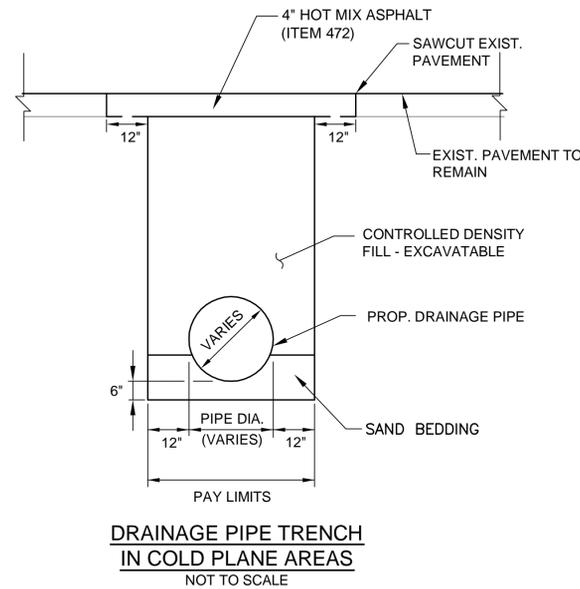
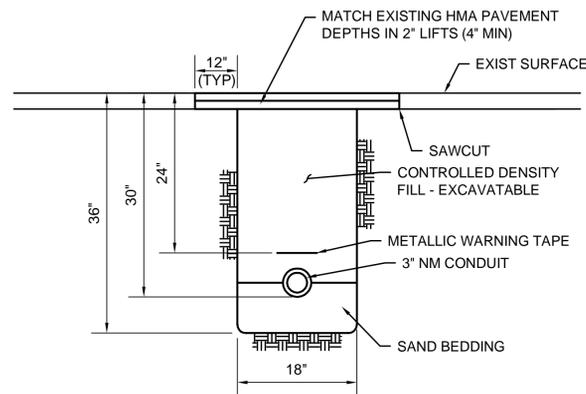
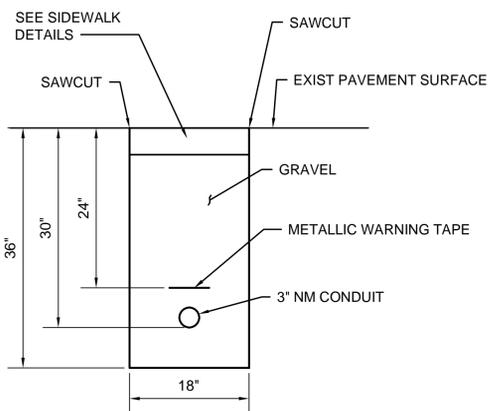
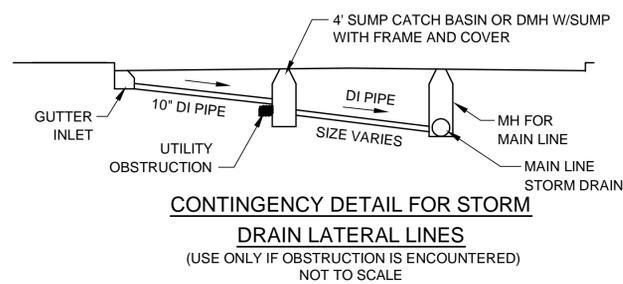
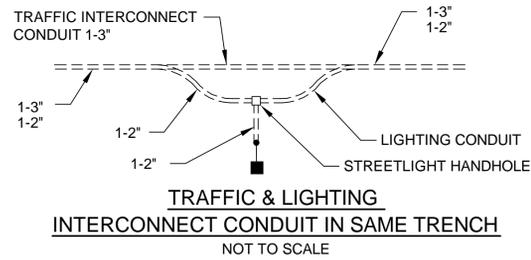
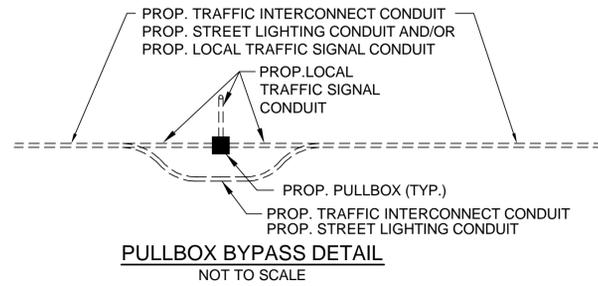
www.BETA-inc.com

SCALE:

UNLESS OTHERWISE NOTED OR CHANGED BY REPRODUCTION

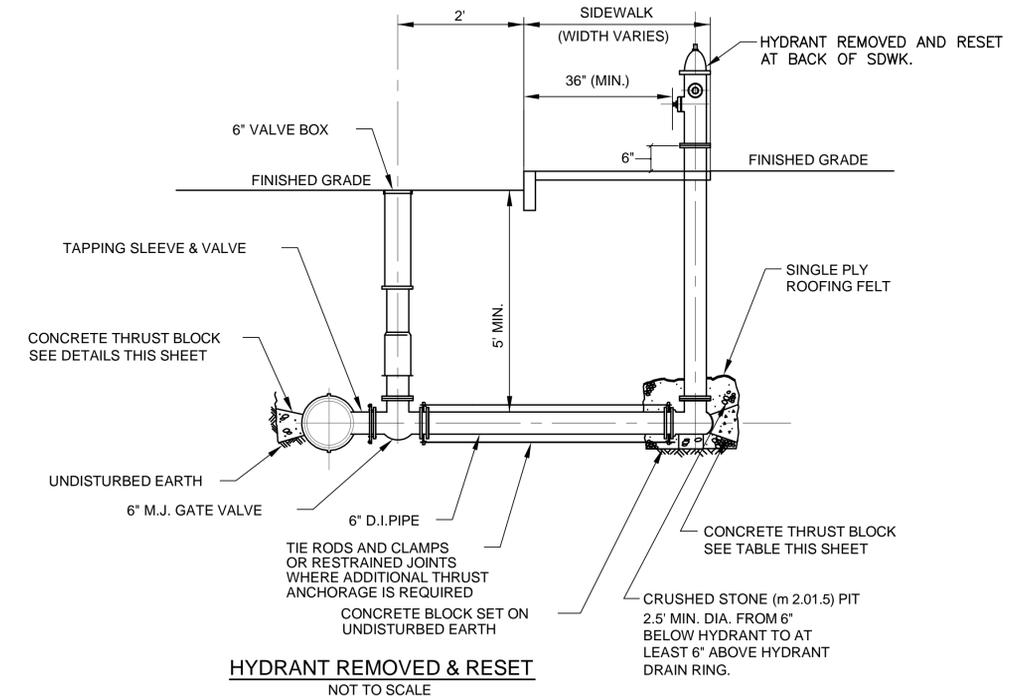
**TOWN CENTER
PHASE-I IMPROVEMENTS
CONSTRUCTION DETAILS
NEEDHAM, MASSACHUSETTS**

BETA JOB No. 5126
PLOT DATE: 2/11/2016 4:29 PM
ISSUE DATE: 12/10/2015
SHEET No. **7 OF 42**
File: 5126 DETAILS.dwg



PEDESTRIAN PUSH BUTTON CLEAR ZONE
SCALE: N.T.S.

NOTE:
A CLEAR GROUND SPACE SHALL CONSIST OF A STABLE AND FIRM AREA, COMPLYING WITH 521 CMR 6.5 (FORWARD REACH) OR 521 CMR 6.6 (SIDE REACH) AND SHALL BE PROVIDED AT EACH OF THE PEDESTRIAN PUSH BUTTONS.
a) WHERE A FORWARD APPROACH IS PROVIDED, PEDESTRIAN PUSH BUTTONS SHALL ABUT AND BE CENTERED ON THE CLEAR GROUND SPACE.
b) WHERE A PARALLEL APPROACH IS PROVIDED, PEDESTRIAN PUSH BUTTONS SHALL BE WITHIN TEN INCHES (10") HORIZONTALLY OF AND CENTERED ON THE CLEAR GROUND SPACE.



O:\5100s\5126 - Needham - Downtown Streetscape Phase 1\Drawing Files\Plan Set\5126_DETAILS.dwg

DESIGNED BY: TJ	CHECKED BY: DJ			
DRAWN BY: CK	PE STAMP:			
CHECKED BY: DJ	PREPARED BY:			
NUMBER	DATE	MADE BY	CHECKED BY	DESCRIPTION
REVISIONS				

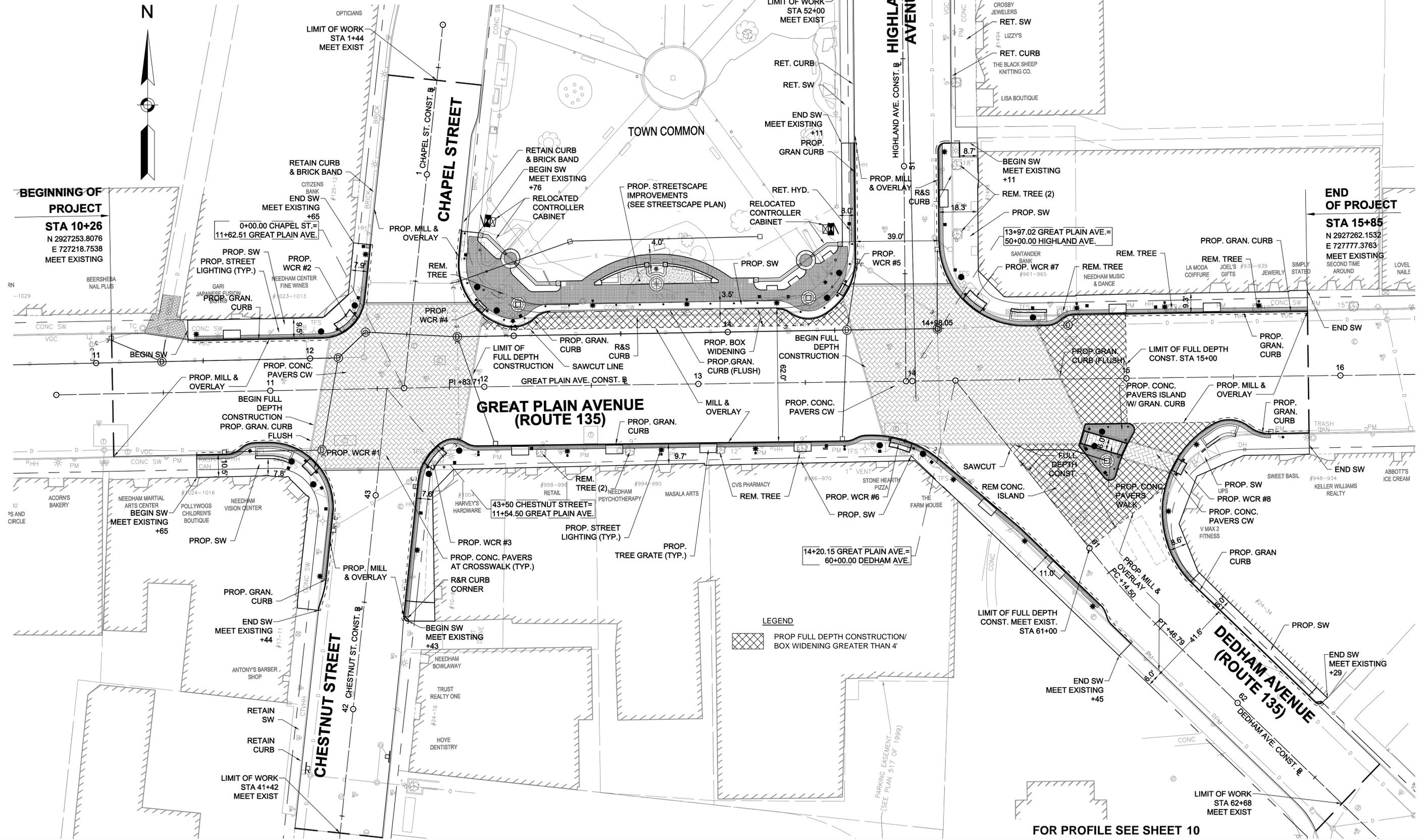


SCALE:

UNLESS OTHERWISE NOTED OR CHANGED BY REPRODUCTION

**TOWN CENTER
PHASE-I IMPROVEMENTS
CONSTRUCTION DETAILS
NEEDHAM, MASSACHUSETTS**

BETA JOB No. 5126
PLOT DATE: 2/11/2016 4:29 PM
ISSUE DATE: 12/10/2015
SHEET No. **8 OF 42**
File: 5126_DETAILS.dwg



O:\5100a\5126 - Downtown Streetscape Phase 1\Drawing Files\Plan Set\5126 CONST.dwg

NUMBER	DATE	MADE BY	CHECKED BY	DESCRIPTION
REVISIONS				

DRAWN BY:	CK
DESIGNED BY:	KY
CHECKED BY:	DJ

PE STAMP:

PREPARED BY:



www.BETA-Inc.com

SCALE:

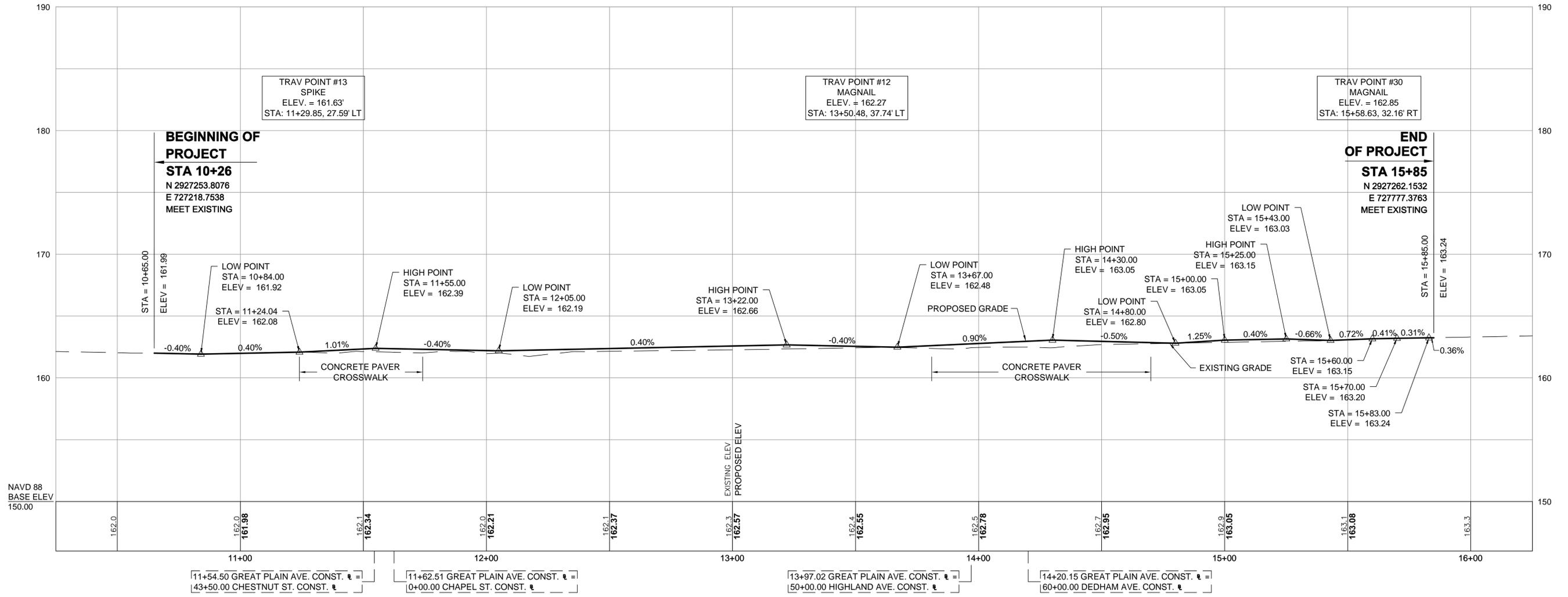
UNLESS OTHERWISE NOTED OR CHANGED BY REPRODUCTION

FOR PROFILE SEE SHEET 10

**TOWN CENTER
PHASE-I IMPROVEMENTS
CONSTRUCTION PLAN
NEEDHAM, MASSACHUSETTS**

BETA JOB No.	5126
PLOT DATE:	2/11/2016 4:31 PM
ISSUE DATE	12/10/2015
SHEET No.	9 OF 42
File:	5126 CONST.dwg

GREAT PLAIN AVE. - PHASE I



C:\5100a\5126 - Needham - Downtown Streetscape Phase 1\Drawing Files\Plan Set\5126 PROFILE.dwg

NUMBER	DATE	MADE BY	CHECKED BY	DESCRIPTION

DRAWN BY: CK
 DESIGNED BY: TJ
 CHECKED BY: DJ

PE STAMP:
 PREPARED BY:



SCALE:

UNLESS OTHERWISE NOTED OR CHANGED BY REPRODUCTION

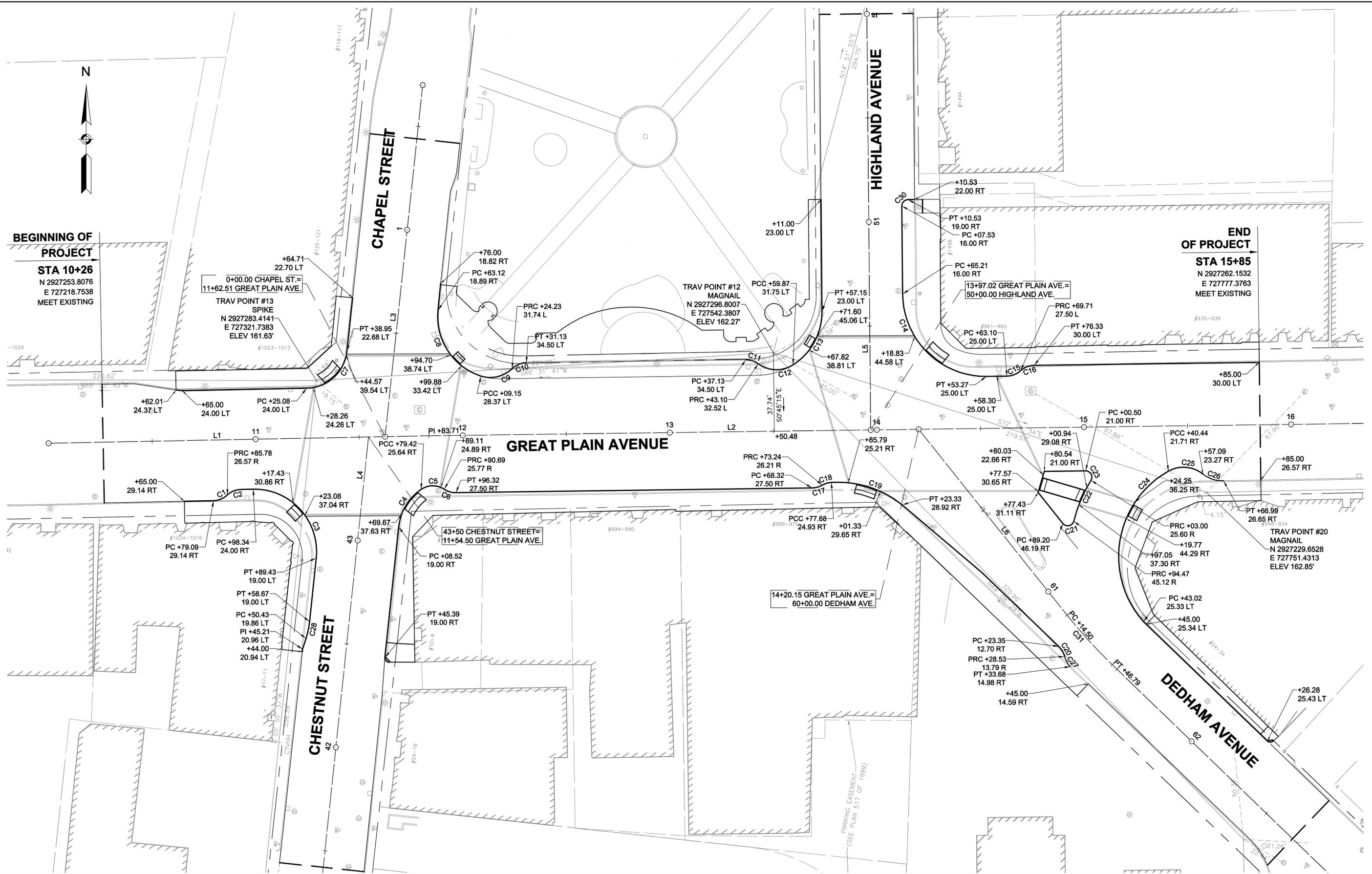
TOWN CENTER
PHASE-I IMPROVEMENTS
PROFILE
NEEDHAM, MASSACHUSETTS

BETA JOB No. 5126
 PLOT DATE: 2/11/2016 4:32 PM
 ISSUE DATE: 12/10/2015
 SHEET No. **10 OF 42**
 File: 5126 PROFILE.dwg



BEGINNING OF PROJECT
STA 10+26
 N 2927253.8076
 E 727218.7538
 MEET EXISTING

END OF PROJECT
STA 15+85
 N 2927262.1532
 E 727777.3763
 MEET EXISTING



O:\5100s\5126 - Needham - Downtown Streetscape Phase 1\Drawing Files\Plan Set\5126 TIE.dwg

NUMBER	DATE	MADE BY	CHECKED BY	DESCRIPTION
REVISIONS				

DRAWN BY: CK
 DESIGNED BY: KY
 CHECKED BY: DJ

PE STAMP:

PREPARED BY:



www.BETA-Inc.com

SCALE:

UNLESS OTHERWISE NOTED OR CHANGED BY REPRODUCTION

**TOWN CENTER
 PHASE-I IMPROVEMENTS
 TIE PLAN
 NEEDHAM, MASSACHUSETTS**

BETA JOB No. 5126
 PLOT DATE: 2/11/2016 4:33 PM
 ISSUE DATE: 12/10/2015
 SHEET No. **11 OF 42**
 File: 5126 TIE.dwg

O:\5100a\5126 - Needham - Downtown Streetscape Phase 1\Drawing Files\Plan Set\5126 TIE.dwg

GREAT PLAIN AVE. - Phase I CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L1	10+00.00	2927253.295	727192.447		N88° 53' 02"E 183.71'	11+83.71	2927256.873	727376.122
L2	11+83.71	2927256.873	727376.122		N89° 14' 45"E 466.29'	16+50.00	2927263.011	727842.372

CHAPEL STREET CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L3	0+00.00	2927256.460	727354.928		N6° 07' 19"E 170.00'	1+70.00	2927425.491	727373.057

CHESTNUT STREET CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L4	33+20.00	2926232.011	727238.643		N6° 02' 03"E 1030.00'	43+50.00	2927256.304	727346.916

HIGHLAND AVE. CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L5	50+00.00	2927259.681	727589.410		N0° 32' 05"W 926.34'	59+26.34	2928185.982	727580.766

DEDHAM AVE. CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L6	60+00.00	2927259.985	727612.539		S38° 44' 27"E 114.50'	61+14.50	2927170.679	727684.192
C31	61+14.50	2927170.679	727684.192	R=249.50' Δ=7°24'59" L=32.30' T=16.17'		61+46.79	2927146.865	727705.974

CURVE TABLE				
CURVE #	RADIUS	DELTA	LENGTH	TANGENT
C1	10.00	42° 00' 17"	7.33	3.84
C2	10.00	42° 00' 17"	7.33	3.84
C3	30.00	97° 09' 00"	50.87	34.00
C4	25.00	49° 58' 17"	21.80	11.65
C5	10.00	67° 29' 55"	11.78	6.68
C6	10.00	34° 15' 29"	5.98	3.08
C7	20.00	82° 48' 27"	28.91	17.63
C8	30.00	78° 09' 13"	40.92	24.36
C9	15.00	61° 59' 55"	16.23	9.01
C10	10.00	43° 35' 27"	7.61	4.00
C11	10.00	36° 39' 41"	6.40	3.31
C12	15.00	68° 04' 54"	17.82	10.13
C13	30.00	58° 21' 36"	30.56	16.75
C14	40.00	90° 13' 10"	62.99	40.15
C15	10.00	41° 24' 35"	7.23	3.78
C16	10.00	41° 24' 35"	7.23	3.78
C17	10.00	29° 25' 11"	5.13	2.63
C18	10.00	26° 44' 59"	4.67	2.38
C19	50.15	41° 52' 46"	36.66	19.19
C20	10.00	32° 17' 32"	5.64	2.90
C21	3.00	127° 01' 29"	6.65	6.02
C22	71.00	17° 15' 11"	21.38	10.77
C23	3.00	122° 14' 30"	6.40	5.44
C24	47.00	102° 34' 21"	84.14	58.64
C25	15.00	67° 47' 16"	17.75	10.08
C26	15.00	40° 47' 31"	10.68	5.58
C27	10.00	32° 23' 49"	5.65	2.90
C28	40.00	11° 52' 50"	8.29	4.16
C30	3.00	90° 00' 00"	4.71	3.00

NUMBER	DATE	MADE BY	CHECKED BY	DESCRIPTION

DRAWN BY: CK
DESIGNED BY: KY
CHECKED BY: DJ

PE STAMP:

PREPARED BY:



www.BETA-Inc.com

SCALE:

UNLESS OTHERWISE NOTED OR CHANGED BY REPRODUCTION

**TOWN CENTER
PHASE-I IMPROVEMENTS
TIE PLAN
NEEDHAM, MASSACHUSETTS**

BETA JOB No. 5126
PLOT DATE: 2/11/2016 4:33 PM
ISSUE DATE: 12/10/2015
SHEET No. 12 OF 42
File: 5126 TIE.dwg



7 BEGINNING OF PROJECT
STA 10+26

END OF PROJECT
STA 15+85

GREAT PLAIN AVENUE (ROUTE 135)

HIGHLAND AVENUE

CHAPEL STREET

CHESTNUT STREET

DEDHAM AVENUE
(ROUTE 135)

LEGEND

- (XXX.XX) x EXIST. ELEV.
- XXX.XX x PROP. ELEV.
- XXX.XX TC x PROP. ELEV. TC
- XXX.XX BC x PROP. ELEV. BC

O:\5100a\5126 - Needham - Streetscape Phase 1\Drawing Files\Plan Set\5126 GRADING.dwg

NUMBER	DATE	MADE BY	CHECKED BY	DESCRIPTION
REVISIONS				

DRAWN BY: CK	PE STAMP:
DESIGNED BY: TJ	
CHECKED BY: DJ	

PREPARED BY:



www.BETA-Inc.com

SCALE:

UNLESS OTHERWISE NOTED OR CHANGED BY REPRODUCTION

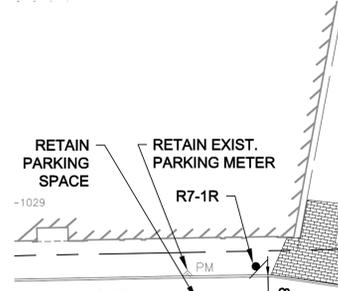
**TOWN CENTER
PHASE-I IMPROVEMENTS
GRADING PLAN
NEEDHAM, MASSACHUSETTS**

BETA JOB No.	5126
PLOT DATE:	2/11/2016 4:35 PM
ISSUE DATE:	12/10/2015
SHEET No.	13 OF 42
File:	5126 GRADING.dwg

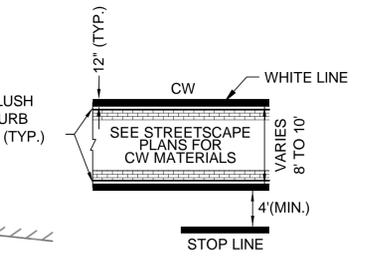
SIGN & PAVEMENT MARKING NOTES

1. ALL EXISTING SIGNS AND SIGN POSTS WITHIN THE PROJECT LIMITS SHALL BE R&D UNLESS OTHERWISE NOTED ON PLANS.
2. ALL PROPOSED PAVEMENT MARKINGS SHALL BE THERMOPLASTIC. ALL EXISTING PAVEMENT MARKINGS THAT CONFLICT WITH THE PROPOSED PAVEMENT MARKINGS SHALL BE REMOVED BY AN APPROVED METHOD.
3. ALL PROPOSED SIGN POSTS SHALL BE P-5 TYPE (TELESCOPIC POST) PAINTED GLOSS BLACK. UNLESS OTHERWISE PROVIDED FOR IN THE MUTCD, ALL SIGNS SHOULD BE 90° TO THE CURB AND FACING THE FLOW OF TRAFFIC.
4. STREET SIGNS SHALL BE MOUNTED PARALLEL WITH THE STREET.
5. ALL R&R SIGNS SHALL BE MOUNTED ON NEW POSTS.
6. SIGNS TO BE MOUNTED NEAR THE CURB LINE SHALL BE SET BACK 6" FROM THE EDGE OF THE SIGN PANEL TO THE CURB LINE. NO SIGN SHALL OVERHANG THE CURB LINE.
7. ALL SIGNS SHALL BE MOUNTED TO PROVIDE A 7' MINIMUM CLEARANCE BETWEEN THE BOTTOM OF THE SIGN AND FINISHED GRADE.
8. ALL R7 PARKING SIGNS SHALL BE MOUNTED AT AN ANGLE OF NOT LESS THAN 30° NOR MORE THAN 45° TO THE CURB AND FACING THE FLOW OF TRAFFIC.

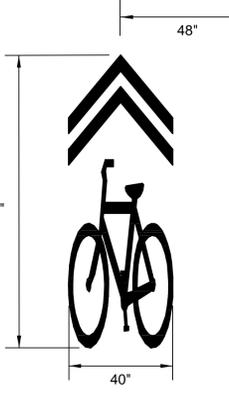
ARROW & "ONLY" DETAIL
NOT TO SCALE



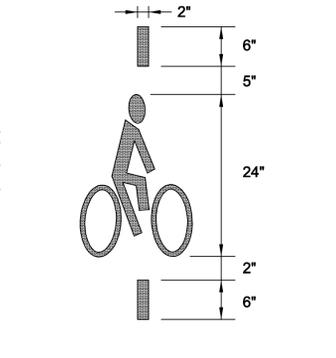
CROSSWALK MARKING DETAIL
NOT TO SCALE



SHARROW DETAIL
NOT TO SCALE



BICYCLE MARKING DETAIL
NOT TO SCALE



C:\5100a\5126 - Needham - Streetscape Phase 1\Drawing Files\Plan Set\5126_SIGN_PMRK.dwg

NUMBER	DATE	MADE BY	CHECKED BY	REVISIONS	DESCRIPTION

DRAWN BY: JMC	PE STAMP:
DESIGNED BY: MWW	
CHECKED BY: DJ	

PREPARED BY:

www.BETA-Inc.com

SCALE:	UNLESS OTHERWISE NOTED OR CHANGED BY REPRODUCTION
--------	---

**TOWN CENTER
PHASE-I IMPROVEMENTS
SIGN & PAVEMENT MARKING PLANS
NEEDHAM, MASSACHUSETTS**

BETA JOB No.	5126
PLOT DATE:	2/11/2016 4:38 PM
ISSUE DATE:	12/10/2015
SHEET No.	17 OF 42
File:	5126_SIGN_PMRK.dwg

IDENTIFICATION NUMBER	SIZE OF SIGN		TEXT	DIMENSIONS (in)			NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED	UNIT AREA IN SQUARE FEET	AREA IN SQUARE FEET	
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW		BACK-GROUND	LEGEND	BORDER				
R1-2	36 in	36 in					1	RED	RED	WHITE	P-5 1	9.0	9.0	
R3-2	36 in	36 in					1	WHITE	RED/BLACK	BLACK	MOUNT ON M.A.	9.0	9.0	
R3-2b	24 in	24 in					1				P-5 1	4.0	4.0	
R3-5R	30 in	36 in					1	WHITE	BLACK	BLACK	MOUNT ON M.A.	7.5	7.5	
R3-7L	30 in	30 in					6	WHITE	BLACK	BLACK	P-5 6	6.25	37.5	
R3-7R	30 in	30 in					4	WHITE	BLACK	BLACK	P-5 4	6.25	25.0	
R5-1	30 in	30 in					2	WHITE	RED/BLACK	BLACK	P-5 2	6.25	12.5	
R6-1 (PBS)	36 in	12 in					2	WHITE/BLACK	BLACK	BLACK	MOUNT W/R5-1	3.0	6.0	
R7-1	12 in	18 in					8	WHITE	RED	RED	P-5 8	1.5	12.0	
R7-1L	12 in	18 in					1	WHITE	RED	RED	P-5 1	1.5	1.5	
R7-1R	12 in	18 in					2	WHITE	RED	RED	P-5 2	1.5	3.0	
R7-8R	12 in	18 in					2	BLUE	WHITE	WHITE	P-5 2	1.5	3.0	
R7-11	12 in	18 in					4	WHITE	RED	RED	MOUNT 1 W/R7-8R 3 P-5	1.5	6.0	
R10-3e(L)	9 in	15 in					8	WHITE	WHITE/ORANGE/BLACK	BLACK	MOUNT ON SIG POST	PAID UNDER ITEMS 12.2.20a & 12.2.20b		
R10-3e(R)	9 in	15 in					8	WHITE	WHITE/ORANGE/BLACK	BLACK	MOUNT ON SIG POST			
R10-11b	36 in	36 in					7	WHITE	BLACK	BLACK	MOUNT 6 ON M.A. 1 ON POST	9.0	63.0	
R10-12	30 in	36 in					3	WHITE	GREEN/BLACK	BLACK	MOUNT ON M.A.	7.5	22.5	
M1-5(135)	30 in	24 in	138				1	WHITE	BLACK	BLACK	P-5 1	5.0	5.0	
M3-2	24 in	12 in	EAST				1	WHITE	BLACK	BLACK	MOUNT W/M1-5	2.0	2.0	
M5-1R	21 in	15 in					1	WHITE	BLACK	BLACK	MOUNT W/M1-5	2.2	2.2	
H1-1	18 in	18 in					1	YELLOW	YELLOW	YELLOW	P-5 1	6.25	6.25	

SEE 2009 MUTCD STANDARDS

SEE MASSDOT STANDARDS

IDENTIFICATION NUMBER	SIZE OF SIGN		TEXT	DIMENSIONS (in)			NUMBER OF SIGNS REQUIRED	COLOR			POST SIZE AND NUMBER REQUIRED	UNIT AREA IN SQUARE FEET	AREA IN SQUARE FEET
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW		BACK-GROUND	LEGEND	BORDER			
D3-1	60 in	12 in	Great Plain Ave	6/4.5C	3 3		4	GREEN	WHITE	WHITE	MOUNT 3 ON M.A. 1 P-5	EACH	EACH
D3-2	42 in	12 in	Chapel St				1				MOUNT ON M.A.	EACH	EACH
D3-3	48 in	12 in	Chestnut St				1				MOUNT ON M.A.	EACH	EACH
D3-4	54 in	12 in	Highland Ave				1				MOUNT W/D3-1	EACH	EACH
D3-5	48 in	12 in	Dedham Ave				1				MOUNT ON M.A.	EACH	EACH

NOTES:

- HIGH INTENSITY ENCAPSULATED LENS REFLECTIVE SHEETING CONFORMING TO SECTION M9:30.0, TYPE III OR IV, OF THE MASSDOT STANDARD SPECIFICATIONS SHALL BE USED FOR ALL SIGNS.
- ALL P5 POSTS SHALL BE TELESCOPIC, RECTANGULAR TYPE POSTS, CONFORMING TO THE DIMENSIONS AND REQUIREMENTS OF THE MASSDOT "STANDARD DRAWINGS FOR SIGNS AND SUPPORTS" (LATEST EDITION).
- PBS: PAINTED BOTH SIDES.
- SEE THE 2009 "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" AND "STANDARD HIGHWAY SIGNS" FOR THE LATEST SPECIFICATIONS ON TEXT, DIMENSIONS AND COLOR. (ALSO SEE SECTION M9.30.0 TYPE III MASSDOT STANDARD SPECIFICATION, THE "MASSACHUSETTS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES," AND "GUIDE SIGN POLICY FOR SECONDARY STATE HIGHWAYS" (LATEST EDITIONS) BY THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION).
- STREET NAME (D3) SIGNS SHALL CONFORM TO TOWN OF NEEDHAM SIGN STANDARDS. SEE SPECIAL PROVISIONS.
- ALL STREET NAME (D3) SIGNS SHALL BE PAINTED BOTH SIDES.

O:\5100a\5126 - Needham - Downtown Streetscape Phase 1\Drawing Files\Plan Set\5126 TSS.dwg

NUMBER	DATE	MADE BY	CHECKED BY	DESCRIPTION

DRAWN BY: JMC	PE STAMP:
DESIGNED BY: MWW	
CHECKED BY: DJ	

PREPARED BY:	 www.BETA-Inc.com

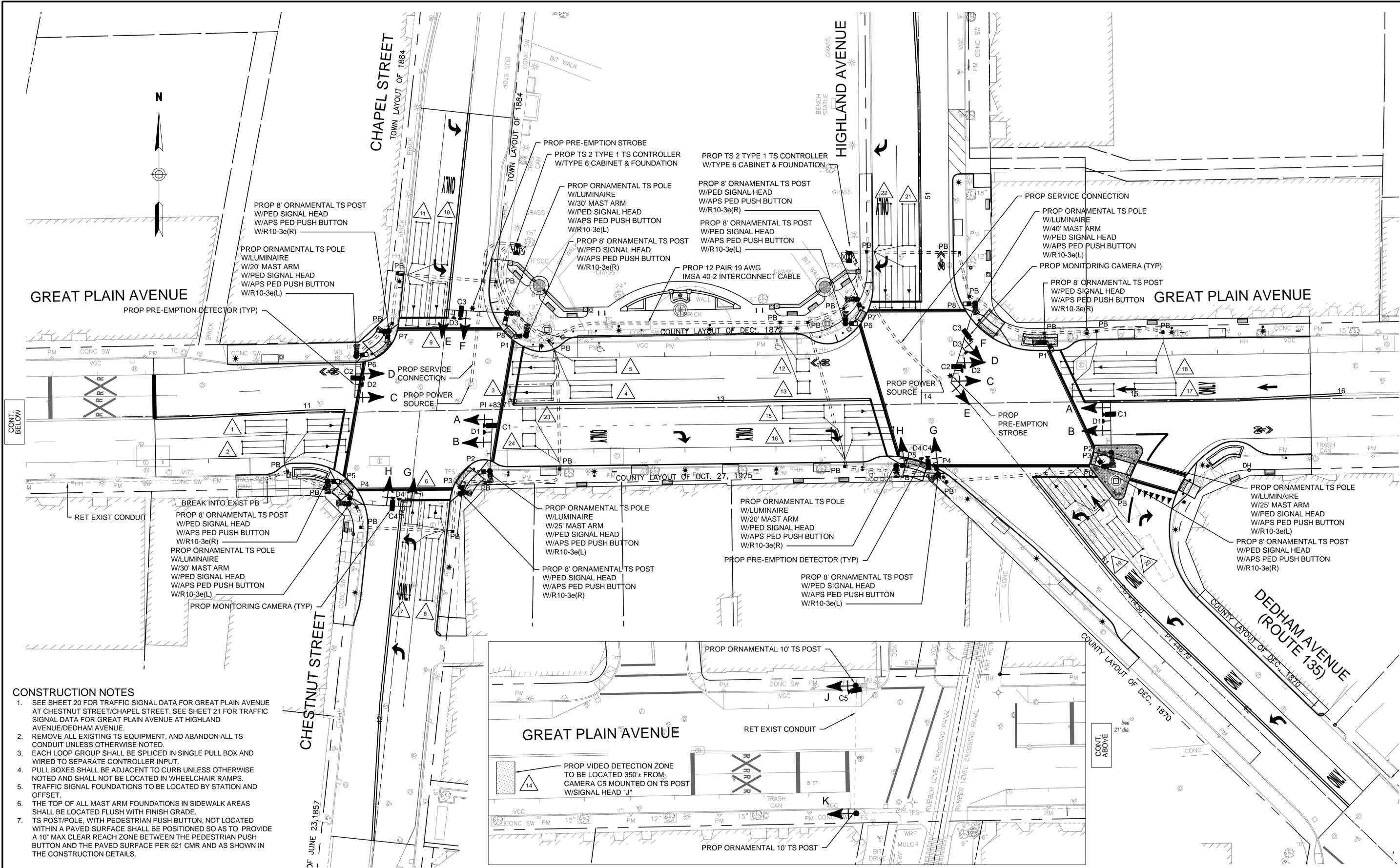
SCALE:	NOT TO SCALE
--------	--------------

UNLESS OTHERWISE NOTED OR CHANGED BY REPRODUCTION

TOWN CENTER PHASE-I IMPROVEMENTS TRAFFIC SIGN SUMMARY NEEDHAM, MASSACHUSETTS

BETA JOB No. 5126
PLOT DATE: ---
ISSUE DATE 12/10/2015
SHEET No. 18 OF 42
File: 5126 TSS.dwg

C:\5100a\5126 - Needham - Downtown Streetscape Phase 1\Drawing Files\Plan Set\1257004-TSIG.dwg



- CONSTRUCTION NOTES**
- SEE SHEET 20 FOR TRAFFIC SIGNAL DATA FOR GREAT PLAIN AVENUE AT CHESTNUT STREET/CHAPEL STREET. SEE SHEET 21 FOR TRAFFIC SIGNAL DATA FOR GREAT PLAIN AVENUE AT HIGHLAND AVENUE/DEDHAM AVENUE.
 - REMOVE ALL EXISTING TS EQUIPMENT, AND ABANDON ALL TS CONDUIT UNLESS OTHERWISE NOTED.
 - EACH LOOP GROUP SHALL BE SPLICED IN SINGLE PULL BOX AND WIRED TO SEPARATE CONTROLLER INPUT.
 - PULL BOXES SHALL BE ADJACENT TO CURB UNLESS OTHERWISE NOTED AND SHALL NOT BE LOCATED IN WHEELCHAIR RAMPS.
 - TRAFFIC SIGNAL FOUNDATIONS TO BE LOCATED BY STATION AND OFFSET.
 - THE TOP OF ALL MAST ARM FOUNDATIONS IN SIDEWALK AREAS SHALL BE LOCATED FLUSH WITH FINISH GRADE.
 - TS POST/POLE, WITH PEDESTRIAN PUSH BUTTON, NOT LOCATED WITHIN A PAVED SURFACE SHALL BE POSITIONED SO AS TO PROVIDE A 10" MAX CLEAR REACH ZONE BETWEEN THE PEDESTRIAN PUSH BUTTON AND THE PAVED SURFACE PER 521 CMR AND AS SHOWN IN THE CONSTRUCTION DETAILS.

NUMBER	DATE	MADE BY	CHECKED BY	DESCRIPTION
REVISIONS				

DRAWN BY: AED
 DESIGNED BY: AED
 CHECKED BY: PTN

PE STAMP:
 PREPARED BY:


SCALE:
 UNLESS OTHERWISE NOTED OR CHANGED BY REPRODUCTION

**TOWN CENTER
 PHASE-I IMPROVEMENTS
 TRAFFIC SIGNAL PLANS
 NEEDHAM, MASSACHUSETTS**

BETA JOB No. 5126
 PLOT DATE: 2/11/2016 4:39 PM
 ISSUE DATE: 12/10/2015
 SHEET No. **19 OF 42**
 File: 1257004-TSIG.dwg

